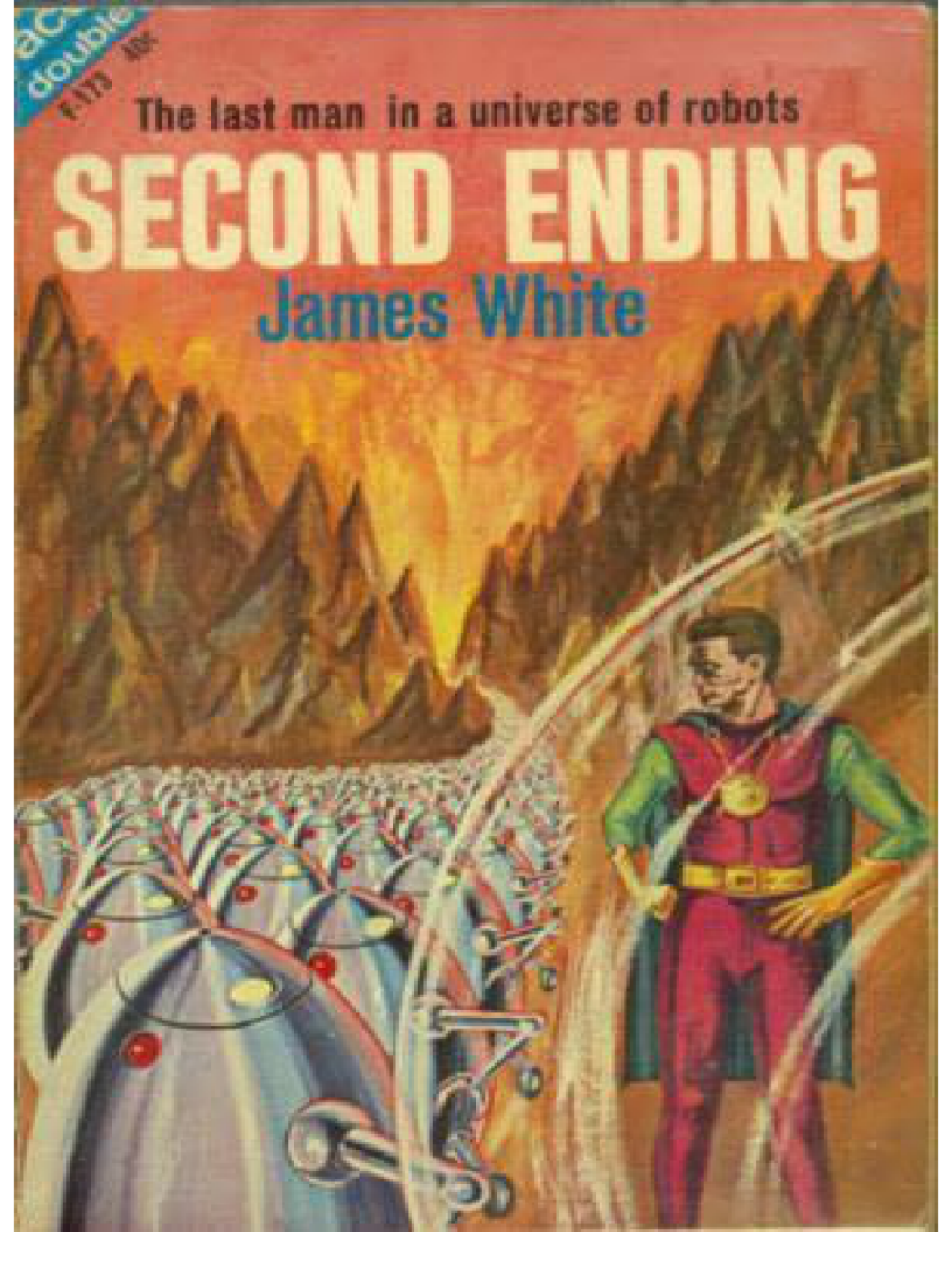
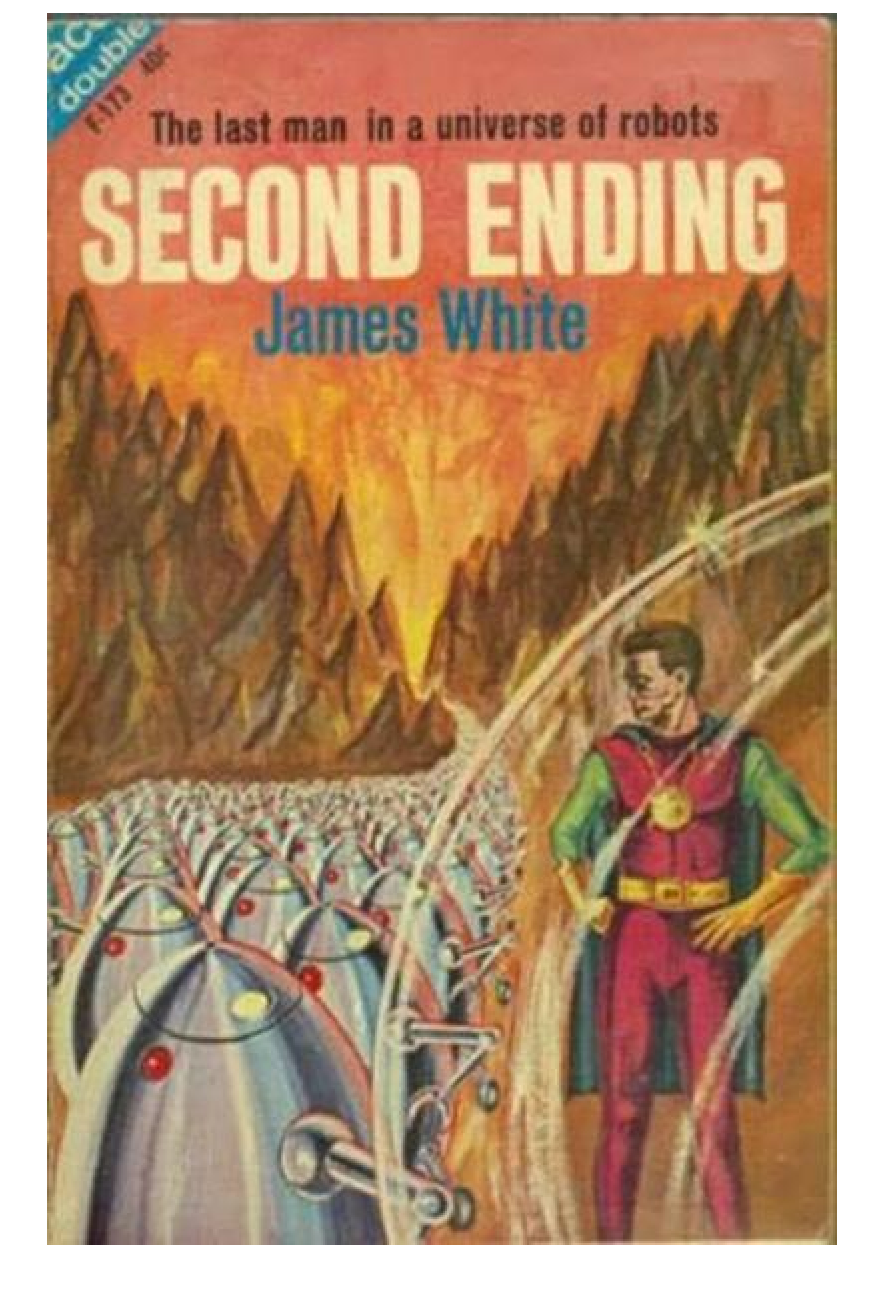

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F-173 40c
The last man in a universe of robots
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Second Ending

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Chapter Links

"Second Ending" is one of my own favorite stories, and not just because it was voted onto the short list of five novels for the 1963 Hugo award (Heinlein's *Stranger in a Strange Land,* a much longer, and better, story, won it that year). So strongly did I feel about the story that when it was submitted to my favorite editor and he requested a few changes — including a reduction in length to twenty thousand words and the introduction of a surviving island of humanity! — I demurred. It was the only time in my writing career that I said "No" to an editor in such forthright language. After close on a quarter of a century in the game, I have now learned how to make all my "No's" sound like "Well, maybe's."

Returning to the original question, "Where on Earth do you get those crazy ideas from?", it seems that in my case they come from unfulfilled ambitions, feelings of injustice, meeting a bedraggled dog or a beautiful girl, or from a friend with polluted pants. But the simple answer is that all of the ideas have a solidly terrestrial origin, and so the question answers itself.

---James White

1

For Ross, the process of awakening was a slow thaw. Gradually there was growing within his mind a spot of warmth, melting and clearing the long-unused channels of memory and perception. For a time he knew only that he was somebody and that it was very cold, and then he began to remember other cold awakenings and the nightmares which followed them. He tried to tell himself that this was all wrong, that nightmares preceded awakening and not the other way around, but his memory insisted otherwise. It insisted so strongly that, had such a reaction been physically possible, Ross would have broken into a sweat of fear. Eventually sound and vision came to him, the icy fog of Deep Sleep cleared and he saw Beethoven.

Someone had given Beethoven's hair a coat of black enamel, painted the face with a realistic flesh tint and touched in the eyes with blue, but it was still the same bust which had occupied a place of honor in Pellew's consulting room. That someone, Ross knew, was in for trouble, because Dr. Pellew was not a man who took kindly to practical jokes. All at once that line of thought became a very comforting one for Ross, because it opened up the possibility that the nightmares had been practical jokes also. He seemed to remember that there had been quite a few jokers in this place, especially on the thirty-first level. But why such a needlessly cruel trick, and why had they picked him? Who, exactly, were they? What was this place, what was he doing here, who was Pellew…?

Ross didn't know, exactly. His mental processes were quickening, but he was demanding answers from a memory which was still woefully incomplete. He sighed audibly, and suddenly Beethoven was talking to him.

"When the patient has recovered consciousness," Beethoven said in a dry, lecturing voice which was remarkably like that of Dr. Pellew, "it is important that he make no sudden movements, which at this stage could result in severe muscular damage. He, or she, must be urged to move gently. The patient should also be assured, as often as seems necessary considering his emotional state, that he has been cured he has been cured he has been cured he has been cured…"

Like a record with a faulty groove, the same words droned out over and over and over. Ross stuck it out for as long as he could, which was about six minutes; then he croaked, "Shut up, I believe you!"

The voice ceased. Ross became aware of a steadily mounting pressure at the back of his head and shoulders. Chest, neck and leg muscles cracked painfully, and he realized that his posture was altering. The padded surface on which he lay had broken in two places. It was swinging upward from a point below his waist and falling away at the level of his knees. He was being forced from a supine into a sitting position. The process was slow and was probably meant to be gentle. Ross would have yelled in sheer agony, if he had not known that filling his lungs for the yell would have expanded his chest muscles suddenly and added to the pain. Finally he was sitting upright, held by a strap around his middle. He felt the strap, because his eyes showed little more than drifting patches of blackness. Strain as he might to see more, for the moment the blackness continued to prevail. The voice began again:

"With long-term patients there will be psychological difficulties as well," the bust said through its motionless, painted lips. "He is awakening into an environment which is completely strange, and perhaps frightening, to him. Someone with an understanding of his background should be present, and the shock can be lessened by surrounding him with his more valuable personal possessions…"

Ross blinked until the black patches faded from sight. He was in a small room which contained, in addition to the contraption he was sitting in, a bed, some recessed cupboards and a floor which was neatly paved with what looked like foam-rubber mattresses. Close by was an instrument trolley containing the talking bust of Beethoven, three shiny cans and his wallet, opened to show the picture of Alice.

"… At the same time the patient must take nourishment and exercise his muscles as soon as possible after revivication. The method recommended is to raise him into a sitting position, massage, administer a light, liquid meal liquid meal liquid meal liquid meal…"

"Oh, for Heaven's sake!" Ross groaned, and reached out carefully for one of the food containers. This, he thought, was the most intricate and senseless joke he had ever heard of. He did not feel hungry, but doing what he was told seemed to be the only way of shutting off that maddening, repetitious voice.

The can warmed up as soon as he lifted it and the top flipped back, spilling some of the stuff onto his bare legs. He swore, sniffed, then began to wonder if perhaps he wasn't hungry after all. The stuff tasted

every bit as good as it smelled, and it warmed him right down to his toes. But when he had emptied the can Beethoven continued to drone "Liquid meal liquid meal" at him. Presumably he was expected to empty all three.

The second can exploded in his face.

Several things happened at once. He jerked backward instinctively as the hot, foul-smelling liquid sprayed his face and chest. The sudden movement triggered off a cramp which nearly tied him in knots, and he began slipping toward the floor. The retaining strap took his weight for a moment; then it parted with a soft tearing sound and he collapsed onto the floor.

That drop of perhaps three feet onto a thickly padded surface brought a shock of pain worse than anything he had ever experienced. It also brought him finally and fully awake.

Up to now Ross had been treating everything which was happening as some sort of involved practical joke which was being played on him; he was both angered at the cruelty of it and relieved that he had not awakened to the nightmare of being crushed to death in a tubular metal cage which ticked. From his new position he could see a small extension speaker unit attached to the back of Beethoven's head, and a cable which ran from it across the floor and out through a hole in the wall. This could have been the sort of joke that his fellow students might have played on him — involving stink bombs, a talking bust and an edited playback of one of Pellew's lectures — but for one thing. The tape had led him to believe that he was cured. No one in the hospital would joke about that.

And if it wasn't a joke…

The First Atomic War had occurred fifty years before Ross had been born. It had started because of malfunctioning of some early-warning equipment and raged for three weeks before the mistake was realized and all parties agreed to the cease-fire. Had it continued for another three weeks the world would have undoubtedly been depopulated completely, but as it was, one out of every ten people survived. Far from causing the collapse of civilization, the war seemed to give it an explosive boot in the pants. Scientific advances came thick and fast; because there were no longer multitudes to be thrown out of work, industry became fully automated, and the world seemed well on the way to becoming a Utopia — except for the nervous tendency of people to build deep instead of high. Possibly because there was still a lot of distrust about, and possibly through sheer force of habit, improvements in nuclear weapons were keeping pace with everything else.

Like everyone else, Ross had been cynical and uncaring about the war. He had never known an overcrowded Earth, and was rather glad he had not been born into such a period. He enjoyed having twenty-one hours of leisure in the twenty-four. But then had come the realization, when he was still in his early teens, that the long-term effects of the war were still horribly evident. The incidence of male and female sterility had passed the 40-percent mark and was still climbing, too few children were being born, and if the trend could not be checked the effect would be exactly the same as if the war had not been stopped.

All at once human life became a rare and precious thing, and promised to become rarer and more precious as time went on. No effort or expense was too great to save, extend or propagate a human life. No case was ever considered hopeless. If a patient could not be cured there and then, well, in the next decade the researchers were bound to come up with the answer, or perhaps in the decade after that. In the meantime the patient was put into suspended animation. They would develop a cure eventually, and while there was life there was hope.

So Ross had applied to train as a doctor in one of the "incurables" hospitals. As well as his basic studies, he had specialized in the techniques of what the purists called hibernation anesthesia and the patients called Deep Sleep, when they both weren't calling it suspended animation. Then, in his fifth year, at the age of twenty-two,

it was discovered that he had a rare lukemic condition — one on which very little research had been done. He had been told that, owing to the fact that he was not likely to be awakened for some time, they would be putting him at the bottom of the heap.

As was customary with long-term patients, Dr. Pellew supervised the freezing personally. And now it seemed to be only hours ago since the old boy had murmured, "Good night, young man, and good luck," in a tone of voice which Ross had never before heard him use to a student, and had administered the shot which kept the patient from feeling the gradually increasing cold.

But it had been more than a matter of hours, obviously.

Ross was thinking of the food container which must have been improperly sealed and whose contents had gone off in both senses of the word. And of the thick retaining strap which had come apart like so much dry putty. An awful lot of time must have passed. Now that he thought back on it, even the recorded voice of Dr. Pellew had sounded older and more tired. But none of those things was important. Neither was the fact that his body was only a little fatter than a demonstration skeleton, or that every square inch of it ached.

He was cured!

Carefully, Ross pushed himself onto his hands and knees and began crawling slowly around the room. His cheek muscles ached because he could not keep himself from grinning, and if he had had the breath for it he would probably have been singing at the top of his voice. A period of sustained, gentle exercise was the next step, and although it was odd that the physiotherapist hadn't arrived, Ross did not mind taking it the hard way. He continued to crawl across soft sponge rubber, feeling the stiffness leave his muscles, smiling and occasionally laughing out loud. He tried not to think about Alice, or the fact that she was probably in her fifties by now and that a very awkward and painful situation would arise between them in the near future. He did not want any hint of sadness to spoil the moment in which he knew that he was no longer under sentence of death.

Eventually he was able to stand upright, with one hand steadying himself against the wall. He opened the locker which contained his clothing, and was met by a blast of cold air which made his eyes water. Moisture began condensing on everything inside the locker, and Ross decided wryly that there was no point in catching

pneumonia through wearing damp clothing after all that had been done to keep him alive. He left the locker door wide open so that the room heaters would dry them. It wasn't that he was a prude, Ross told himself, but his blotchy, emaciated body looked horrible even to him. The sooner it was covered the better. Alice might come in.

Ross walked unsteadily to the bed and sat down. He was beginning to feel hurt by the lack of attention being shown him. Someone should have been around to welcome him back to the land of the living or to say a few words of congratulation — or to check on his condition, at least. There should have been a physician supervising the revivication, a couple of nurses or physiotherapists to walk him about before putting him to bed, and a psychiatrist to cushion him against the mental shocks of awakening. That was how things had been done in his time.

Instead there was a painted, bronze bust, a disjointed lecture tape played through a loudspeaker and rubber mattresses scattered about the floor to keep him from hurting himself. Ross was suddenly afraid. There must be a shortage of staff, he thought.

An acute shortage of staff.

Ross found himself standing with his hand on the doorknob, not remembering how he had got there but knowing by the way that his legs ached that he had moved too fast. The door slid open easily and he stumbled outside. Immediately he knew that he was in a section of the hospital which he had not seen before, perhaps an extension built after he had gone into Deep Sleep. It was a short, brightly lit and spotlessly clean corridor with three doors opening off each side. A few yards to his right the corridor came to a dead end and in the opposite direction it terminated in a semitransparent door which gave the suggestion of a sloping ramp on the other side of it. Just inside the door stood a small desk and chair. There was a pale green folder lying on the desk; there was nobody in the chair.

Propping himself against the wall, Ross moved around to the door facing his own and slid it open. It was dark inside, but light from the corridor showed a stripped bed, locker doors standing open and an empty Deep Sleep casket. He closed it and began a stumbling zigzag along the corridor, trying all the doors. The rooms were dark and empty, but looked as if they had been regularly cleaned — he tested some of the furniture with his fingers. There was a cleaning staff, then, as well as the people responsible for rigging the crazy equipment

in his room. It was high time somebody put in an appearance, Ross thought as he moved toward the desk to sit down.

And began to laugh gently to himself, because the green folder lying on the desk had his name on it.

Since his revivication Ross had both fed and exercised himself without assistance, and now it looked as though he was expected to handle his own reorientation problems as well. Abruptly he stopped laughing, when he realized that there was nothing at all to laugh at in the situation. Ross split the folder's all-around seal with a fingernail — his nails had grown very long despite the fact that all body processes were supposed to be halted by suspended animation — and went through the contents quickly. There were seven of the green 508 forms — the type used for hibernation-anesthesia patients — and about ten sheets of various sizes which looked like interdepartmental memos. Ross went back to the beginning and began to read.

The first green form was familiar to him — Ross had been present when it had been filled in. It was dated 29th September, 2017, and gave his name and the details of the condition which required his going into Deep Sleep. It was signed by Dr. Pellew and his assistant. The next one was similarly signed, was dated 4th June, 2036, and stated that the patient had been revived but kept under complete sedation for three weeks while a new treatment was tested. It was unsuccessful. The third form was dated 1st May, 2093, and was signed by a Dr. Hanson. On this occasion he was revived but unconscious for six weeks while a complex treatment involving micro-injections of his bone marrow was tried, again unsuccessfully. His eyes went back to the date: 1st May, 2093!

The problem of Alice was solved, he thought numbly, by simple mathematics: 2017 from 2093 was seventy-six years, and Alice had been twenty-two. His eyes began to sting and Ross hurriedly changed to a less emotionally loaded train of thought. The notes on his chart showed that medical science had left him far behind; relatively, his training was as outdated as bread poultices and bloodletting. And the growth of his fingernails was explained by the periods during which he had been revived but unconscious. He blinked a couple of times, then turned to the next form.

It was dated 17th May, 2233.

Ross could not believe it at first. He suspected a misprint or a new

system of dating, until he began to read the notes of the physician in charge. They ran to around three hundred neat, closely written words which detailed a treatment so complex that Ross could only guess at what it had entailed. As before, he had been revived but kept under sedation. Something had been done to him — whether it was something injected or attached or surgically implanted he couldn't tell — which had brought about a long-term cure, because the notes ended with a terse "Treatment successful, to be revived permanently in 75 years from this day."

And it was signed by Dr. Pellew and a Sister. At least, the assistant's space had been rubber-stamped ward sister 5b, but she had forgotten to add her initials.

Ross shook his head in weary confusion. It couldn't be Pellew's signature, not after two hundred and sixteen years. It must be a coincidence, he thought, or maybe a great-grandson. Yet he had heard Pellew's voice — his taped voice, rather — during his awakening. Would a tape recording keep for two hundred years? Ross wasn't sure, but it might. But then there was that signature…

The next green form, dated 17th May, 2308, was stamped revivication halted: reprocessed at the bottom by the Ward Sister of 5B, who was apparently either too busy or too well known to have to add her initials. There was no doctor's signature. The next sheet was practically a carbon copy, except for the date, which was four months later, and the last one bore the date 7th October, 2308, and was stamped patient awakened.

Now I know the date, Ross thought, a little wildly; if I had the right time I could set my watch!

All at once Ross felt so unutterably weary that he wanted to lie on the floor and sleep. For a patient just out of Deep Sleep he had been behaving stupidly indeed. Instead of a few minutes' gentle exercise, he had been stumbling about the corridor and sitting on an uncomfortable chair, of the kind designed to keep Night Sisters awake, for the best part of an hour. It was high time he got into bed. Perhaps his brain would be able to make something out of the confused mass of data, after he got some sleep.

Five minutes later Ross was between the sheets, which turned out to be of fine, woven plastic. Their only sign of age was a tendency toward yellow in places. He tried to sleep but his curiosity kept him awake. The green folder, which he had brought along and hidden under his pillow, lay a few inches from his hand. In those unread pages he might find the answer to everything or he might be thrown into worse confusion. He was sure that the contents of the folder would do nothing to increase his peace of mind. But Ross was beginning to be afraid again and he wanted to do everything possible to find out exactly what he feared.

Groaning, he levered himself to one elbow, drew out the folder and began to read.

Immediately following the 508s which he had already studied there was a two-page instructional circular dealing with the transfer of staff to the extension of the five-mile level. This would be devoted to the study of non-sterile mutations. Two Doctors and four Sisters were listed by name and there was a note stating that owing to the shortage of staff the cleaners would also serve as nursing orderlies and be allowed to administer simple courses of treatment without supervision. Dated March, 2062, the circular was signed by Dr. Pellew.

The next five sheets dealt primarily with the reorganization due to the shortage of staff and covered a period of about twenty years. Apparently some of the wards were then operating with just a Sister and two Cleaners. In addition to the cleaning and maintenance work, these people, who had once been considered the lowliest members of the staff, were being given increasingly responsible duties with regard to the patients. They had become Cleaners with a capital C, like Doctors and Sisters.

Ross's mind was bursting with questions. He turned quickly to the next page, hoping that the answers to some of them might be there.

Two short paragraphs, in bold type and underlined, practically shouted up at him.

During the Emergency all sections shall be rendered self-contained and self-sufficient. Transfer of staff, food, medical supplies and servomechanisms is forbidden. Penalty for contravening this regulation, regardless of circumstances, is exclusion from the home section. Con-tact between sections shall be by intercommunication phone only.

All Deep Sleep patients with a favorable prognosis shall be transferred immediately to the Non-sterile Mutations section. Patients to be transferred are…

A list of case numbers followed, Ross's being one of them.

So there had been an Emergency. Ross didn't like the sound of that at all. His hand was shaking with more than fatigue when he turned that page over.

There followed four closely typed pages which were the minutes of a meeting held by all the medical staff of the section, dated 6th July, 2071, Dr. Hanson presiding. Under discussion were the new techniques for treating patients while actually in the Deep Sleep state. The only drawback was that the new treatment required many decades to effect a cure, and, with the exception of Dr. Hanson, who had been born in the section, all the Doctors were men in their sixties. They were therefore faced with the problem of reviving nearly thirty Deep Sleep patients in fifty-odd years later, at which time they themselves would have long since been dead.

The only possible answer was for the Doctors to go into suspended animation also until the time when their patients were due to be revived. However, at least one Doctor would have to remain awake to supervise and to continue with some of the more promising lines of research, which, if they were lucky, might result in cures for all of their suspended patients. A timetable of twenty years asleep and two

awake was suggested, with a three-month overlap to allow the newly awakened Doctor to take over the reins. Being the youngest of the group, Dr. Hanson asked that his waking term be extended to five years, as he was working on a line which might produce a cure for the heart condition which had forced their previous director to undergo suspended animation. They must agree that if Dr. Pellew could be cured and revived, his help would be invaluable. Mention was made of the psychological dangers present in the scheme, and methods suggested for guarding against them, and the report ended with discussion of the staff problem. It was decided to give Cleaners more responsibility and allow the Ward Sisters the right to diagnose, treat and perform limited surgery.

Staring unseeingly at the page, which was the last one, Ross thought, And so endeth the first lesson. For that was what it had been. Unbalanced, over-short, composed of medical charts and instructional circulars, but withal a history lesson designed to help him fit into a strange present.

Something caught in his throat as he thought of those wonderful old men, forced by their short life expectancy to spread out their remaining years to carry the torch of their knowledge across two centuries, in a relay race against time. And young Hanson had been successful, because the circular was dated 2071 and Dr. Pellew had signed one of his 508 forms in 2233.

Suddenly he began to feel the stirrings of hope. A wild, exciting and purely selfish hope. The record had made no reference to nursing staff, but presumably they would have had to go into Deep Sleep also. Suppose one of them was Alice…

The lights went out.

His brain froze in mid-thought and the cold sweat broke on his forehead, hands and at the small of his back. Without knowing why exactly, Ross was terrified. In vain he tried to tell himself that the lights had gone out to let him sleep, that there was nothing frightening about that. But this darkness was absolute, a negation of light which was possible only when all power has gone five miles underground. Ross had left his room door open in the hope that anyone passing would notice and maybe call in; it was just as dark in the corridor. The folder slid to the floor and he lay motionless, his heart banging deafeningly in his ears and teeth jammed together to keep them from chattering.

Then, above the relative din of his racing pulse, he heard movements from the corridor outside.

It was a soft, regular, thumping sound accompanied by a gentle sighing. Outside his door it stopped briefly, then grew louder as it entered his room. Ross strained his eyes desperately into the blackness, trying to give shape and substance to the blotchy retinal images which slid about in the darkness. The faint sighing and thumping seemed to be moving about the center of the room, and he could hear some small objects being lifted or laid down, quietly. The sounds were quiet but, somehow, not stealthy. Whoever was making them knew what he was doing, and could see very well in the dark. Undoubtedly they could see him. Any second now they would come over to his bed…

"Who… who's there?" said Ross.

"Ward Sister," replied a voice out of the blackness, a pleasant, impersonal and unmistakably feminine voice. "You are doing fine, Mr. Ross. Now go to sleep."

The sounds moved toward the door without approaching his bed and began to fade along the corridor. The door leading onto the ramp slid open and closed, and a few seconds later the lights blinded him.

Ross lay back and shielded his eyes until they became used to the lights again. Four self-heating food containers had been placed beside Beethoven, but otherwise nothing had changed in the room. He pulled the sheets up to his chin and relaxed for the first time since his revivication. Weariness made his mind work slowly, but the mental processes were clear and logical. At last he was beginning to make sense out of the mad puzzle facing him, and the Sister who had visited him in complete darkness was the key incident, he thought.

Beethoven, his case history, a Sister who could see extremely well in pitch-blackness…

The most urgent problem when Ross had gone into Deep Sleep had been the sharply declining birthrate, and according to the contents of the folder the problem had worsened steadily. Staff shortage was mentioned on every page. Human life had become a rare and precious thing — so rare, perhaps, and so very precious, that the meaning of the word had widened somewhat. Devoted to the study of non-sterile

mutations... Ross thought. That might explain Sister's extraordinary eyesight, and her visit under a cloak of darkness. They didn't want to shock him, possibly risk driving him insane, by confronting him too suddenly with what the human race had become. That had to be the answer. They were breaking it to him gently, giving information by indirect means, even to the extent of supervising his revivication at a distance.

Ross thought that he was prepared for the shocks now. He probably wouldn't like them, but he wouldn't be terrified or disgusted by them. And if things got tough he could always console himself with the reminder that there were a few real, old-time human beings still in suspended animation. One of them might even be Alice.

The one piece of the puzzle which did not fit his theory was the nightmares. There had been two of them, almost identical, and he still had the conviction that they had occurred after, or at least during, the process of awakening. Thick metal bars pressing down on his head, chest, abdomen and legs. Others crushing his arms into his sides, jamming his legs together, threatening to squeeze in the sides of his skull. Fighting to escape that vicious, inexorable pressure, struggling desperately to see, to move, to breathe. But he could not see, he could only feel and hear: the savage construction of uncaring metal, and an irregular ticking sound...

Until that gap in the picture was filled, Ross thought, he would feel very uncomfortable about going to sleep. He was uneasily wondering who had introduced an Iron Maiden into the hospital when sleep sneaked up on him.

Ross awoke hungry. His first act was to remedy that condition, and he was lucky in that only one of the four food containers had spoiled. While the air conditioner was dispersing the stench of two-hundred-year-old soup, he moved across to his clothes locker and began to dress. His next action must be to go out and find somebody, the Doctor in charge, Sister, anybody, and while the sight of his unclothed body was unlikely to shock any member of the hospital staff, having a few clothes around him would boost his morale considerably.

He hadn't realized just how few clothes that would be.

His socks and underwear fell apart when he tried to get into them, his shirt had gone brittle and cracked when he forced his head into it, and the elastic in his shoes had ceased to be. The slacks were in good condition — they were all wool and had been rather an extravagance in a day of largely synthetic clothing — but his belt came to pieces in his hands. And his hips had shrunk so much that they refused to hold them up. Ross swore, feeling ridiculous.

One of the other lockers contained the woven plastic sheets, he discovered after a brief search. He opened out one of them and began to work at the middle of it with his teeth until he had a hole that he could get his fingers into. The stuff wasn't easy to tear. When the hole was big enough he put his head through it and let the sheet fall down around his shoulders. It came almost to his knees. Working his arms free, he tore one of the pillow coverings into strips, tied one around his waist and made two others into figure-eight bandages which held the shoes on his feet. In the locker mirror the effect wasn't too bad, he thought, but it needed something. A turban, maybe, or a chaplet of laurel leaves?

Ross made a face at himself, snarled, "You look horrible in white," and headed for the corridor.

This time he was able to walk without holding on to the wall. But when he began to ascend the ramp at the end of the corridor, dizziness overtook him and he began to gray out. He realized that he must still be terribly weak and that if he was going to get anywhere at all he would have to take it in easy stages. Climbing slowly, sometimes on hands and knees, Ross ascended to the next level.

He found himself in a long, brightly lit corridor with a T-junction

at the other end. Everything in sight was shining, aseptically clean. Matron must be the strict type, he thought, and hoped that he did not encounter her first. But there were no signs of life or movement about and the only sound was that of his own breathing. Ross moved forward and began trying doors.

By the time he reached the intersection he was both bewildered and uneasy. Many of the doors had opened into small wards and rooms like his own. There could have been a good reason for their being dark and unoccupied, but some of them should have contained members of the staff, or at least shown signs of recent use. The diet kitchens, for instance, the power rooms, or the Sisters' and Cleaners' quarters. Those living quarters bothered Ross. He could not say for sure, because he had been seeing only by reflected light from the corridor, but those rooms had seemed to be large, featureless boxes which were completely devoid of furniture, fittings and personal decoration. Yet everything he saw was so clean. Somebody was responsible for the spotless condition of the place, but who and where? The whole thing was ridiculous!

Maybe they were playing hide and seek, Ross thought wildly; if so, he was getting tired of the game, tired of being "it"...

"Come out, come out!" Ross yelled at the top of his voice, "Wherever you are!" They came out.

They were long cylindrical objects mounted on four padded wheels, possessing at least ten thick, multi-jointed metal arms and various other projections of unknown function. As they rolled steadily toward him, Ross knew with a terrible certainty that what he was seeing was his nightmare — multiplied by twenty. There was almost a score of the things coming at him from the left-hand fork of the corridor. The lights gleamed off their shiny metal sides and folded arms. He could see that each had a double lens arrangement mounted vertically atop a short, headless neck. The upper lens rotated slowly; the lower was directed forward. They advanced without a sound. Ross wanted to run, but his brain seemed to have gotten its signals crossed. All he could do was tremble and sweat, until...

"Our previous instructions were to conceal ourselves until after you had spent some time in Dr. Pellew's room," said a quiet, female voice behind him, "and we were warned that to do otherwise might result in severe psychological disturbance to yourself. The wording of your last order, however, is such that it overrides our previous instructions."

Ross turned around, slowly. The thing behind him was a large, erect ovoid mounted on three wheels and surmounted by one fixed and one swiveling eyepiece. There were no arms but the smooth, egglike body showed the outlines of several panels which might open to reveal anything. Clamped to one of the wheel struts was a large square box with a cable running from it to the main body. It gave the impression of having been stuck on as an afterthought. One of its wheels had a worn tread which emitted a faint sighing sound as it moved toward him. Ross thought of dodging around it and running — or trying to run; he felt almost too weak to stand now — for the ramp, but behind the egg there were more cylinders coming fast.

With his head jerking from side to side Ross watched them roll up to within a yard of him and stop. The rotating lenses turned slowly; the stationary ones were fixed on him.

After several unsuccessful tries Ross made his tongue work. He said, "What... what is all this?"

The cylinders began to tick like runaway clocks and then the egg spoke again. It said, "The question, requiring as it does complete and detailed knowledge of astronomy, anthropology, cybernetics, evolution, mass psychology, metallurgy, medicine, nuclear physics as well as other sciences about which I have no data, is beyond the scope of an electronic brain. For your information, sir, when asking questions or giving orders to a robot the wording must be detailed and non-ambiguous."

So they were only robots who could answer questions — simple questions — and obey orders. Ross began to relax. His first thought was to tell them all to get to blazes out of his sight, but then he decided that that, also, might be too confusing for them. He considered for a moment, then said timidly, "Go back to whatever you were doing before I called you."

They all began to move away, including the egg-shaped one. Ross called, "Not you. Wait. Your voice is familiar — are you the one who came into my room last night?"

"Yes, sir."

"But I'd thought... the mutations..." Ross stammered. "What happened to the mutants?"

"They are dead, sir. The research was discontinued before I was programmed."

Ross shook his head. He had been expecting mutants and had found robots instead. In a way he ought to have expected something like this, because the trend had been well developed even in his time. Full-scale automation spreading from the factories into the homes, guardian robots for small children — there had even been talk of a robot barber. But in his wildest moments Ross would never have thought of them turning one loose in a hospital. Ross had to check an urge to revise his picture of what had happened while he was in Deep Sleep, because the revision would be based on incomplete data and would probably be as wide of the truth as the last one. Horrible mutations working under a cloak of darkness, indeed! He decided not to jump to any conclusions at all until he had been to Dr. Pellew's quarters.

Matching pace with Ross's weary shuffle, the robot led him through a series of short corridors, up another ramp for two levels, then into what appeared to be the administration and maintenance section. Ross was feeling quite pleased with himself. He had had a horde of robots sprung on him without warning only minutes ago, and now he was talking to one of them, almost naturally. Such powers of adaptability, he thought, were something to be proud of.

He kept the conversation simple, of course, and confined mainly to short, direct questions regarding the rooms or machinery they passed. To some of the simple questions the robot gave concise and detailed answers, and occasionally he received a reply of "I'm sorry, sir, I have not been programmed with data on this subject…"

At one point Ross broke off to ask, "Why do you keep calling me 'sir' when you know my name?"

The robot ticked quietly to itself for a few seconds, and Ross went over the question again in his mind to see if it might sound ambiguous. It didn't, so he repeated the question aloud.

The ticking slowed and stopped. "A Ward Sister of my type has two choices of behavior toward human beings," the robot said in its pleasant, feminine voice. "Toward patients we are friendly but authoritative, because we are better qualified to know what will and will not benefit them, and surnames prefixed by 'Mr.' are used. When a

human being is mobile and shows no marked signs of physical malfunction we treat him as our superior. The choice was difficult in your case."

"Between a mobile Boss and a bedridden patient," said Ross drily, "and I was a mobile patient."

"As my superior," the robot went on, "you are not required to give reasons for your misuse and damaging of ward bed linen."

Ross began to laugh softly. Sisters were all the same, he thought; even the mechanical ones were inclined to fuss. He was still laughing when they reached Dr. Pellew's room.

It was much smaller than the quarters Pellew had once occupied, but it contained the same chairs, desk and bookcase. The only items missing were Beethoven and the thin, irascible person of Pellew himself. A heavy ledger lay exactly centered on the desk with an empty ashtray on one side and an adjustable calendar on the other. Pellew had been a notoriously untidy man, Ross knew, so this uncharacteristic neatness must be due to the cleaning robots while Pellew was in Deep Sleep. Knowing that the Doctor was not in a position to object, Ross sat at the desk and opened the ledger.

It was a diary, more than half filled with Pellew's odd, backward-leaning scrawl.

Before he settled down to reading it, the caution of a lowly student who was making free with his superior's holy of holies prompted a question.

"Who is the Doctor in charge at the moment?" Ross asked. "Who's awake, I mean."

"You, sir," said the robot.

"Me! But…"

He had been about to say that he wasn't qualified, that another two years of study would elapse before, if he was lucky, he could tack "Dr." in front of his name. But there was a staff shortage, so much so that they must have been forced to awaken students to fill in for qualified doctors. The ledger would probably tell him why.

"Have you any instructions, sir?" said the robot.

Ross tried to think like a Doctor in charge. He hemmed a couple of times, then said, "Regarding the patients, none at present. But I'm hungry — will you get me something to eat?"

The robot ticked at him.

"I want food," said Ross, making it simple and non-ambiguous. The robot left.

5

The first six pages of the diary were heavy going, not only because they dealt mainly with details of administration in Pellew's almost unreadable writing, but because they were dated only a few months after Ross had gone into Deep Sleep and so contained no information likely to help in his present situation. He began cheating a little, skipping five, seven, twenty pages ahead. He read:

Communications ceased with Section F two hours ago and we have not been able to raise the others for over a week. For purposes of morale I have suggested that this may be due to broken lines caused by the earth tremors, which have been felt even down here. I have ordered the maintenance robots to slot heavy metal girders across the elevator shaft so as to make it impossible for anyone to take the cage up. There are still a few shortsighted, quixotic fools who want to form a rescue party…

Ross remembered an instructional circular from last night which had begun, "During the Emergency…" Apparently this part of the diary dealt with that Emergency, but he had skipped too far ahead. He was turning the pages back slowly when the robot arrived with six food cans.

He opened one and set it on the empty ashtray so as not to mark Pellew's desk. When he went back to the ledger the large, stiff pages had risen up and rolled past his place. Ross inserted his finger and flattened a page at random. It said:

I took Courtland out of hibernation last week. In his present condition he will live only a few months so I have as good as killed him. The fact that he has told me several times that he doesn't mind only makes me feel worse — his bravery pointing up my cowardice. But I need help, and he was one of the best cyberneticists of his time. He is working on a modification of our Mark 5 Ward Sisters for me.

I wanted a robot with judgment and initiative and the Mark 5B seems to have those qualities. Courtland insists that it hasn't, that he has merely increased its data-storage capacity, increased its ability to cross-index this memory data, and made some other changes which I

can't begin to understand. It does NOT have a sense of humor, but only gives this impression because it takes everything it is told literally. Despite all he says, Courtland is very proud of this new robot — he calls it Bea — and says that if he had proper facilities, or even a few more months of life, he could do great things.

I think he has done great things already. If only Ross can carry on. It will be his problem soon.

Ross felt his scalp begin to prickle. Seeing his own name staring up at him had been a shock, but what was the problem mentioned?

"How long since you talked to Dr. Pellew?" he asked the robot suddenly.

"Twenty-three years and fifteen days, sir."

"Oh, as long ago as that. When is he due to be awakened?"

The robot began to tick.

"That is a simple question!" began Ross angrily, then stopped. Maybe it wasn't a simple question, maybe… "Is Pellew dead?"

"Yes, sir."

Ross swallowed. He said, "How many, both patients and staff, are left?"

"One, sir. You."

He had been hungry and had meant to eat. Ross began spooning the contents of the food can into his mouth, trying to pretend that it had not happened. Or maybe these were the blind involuntary movements of a body which has died and does not yet realize it. Pellew was dead, Alice was dead, Hanson, everyone. Claustrophobia was something which normally had not bothered Ross, but now suddenly he wanted out. Everyone he knew — and so far as his mind was concerned, he had known and spoken to them only two days ago — was dead and buried, most of them for hundreds of years. The

hospital had become a vast, shining tomb staffed by metal ghouls, and he was buried in it. He was suddenly conscious of five miles of earth pressing down on him. But he was alive! He wanted out!

Ross did not realize that he had been shouting until the robot said, "Dr. Pellew told me that you might behave in a non-logical manner at this time. He said to tell you that the future of the human race might depend on what you do in the next few years, and not to do anything stupid in the first few hours."

"How can I get out?" said Ross savagely.

A human being would have avoided the question or simply refused to reply, but the Ward Sister was a robot and had no choice in the matter. Even so, while it was giving the information requested it managed to insert a truly fantastic number of objections to his going. The elevator shaft was blocked, there was danger of contamination and the robot's basic programming forbade it to allow Ross to endanger himself…

"Do you know what going mad is?" said Ross, in a voice he didn't recognize as his own. "Have you had experience of mental instability in humans?"

"Yes, sir."

"It is against your programming to force me, by your inaction, into that state?"

"Yes, sir."

"Then get me to the surface!"

It took three hours.

The Ward Sister ticked a lot and generally got into the nearest approach that a machine could manage to a tizzy. Clearing the elevator shafts — there were five altogether — required the help of heavy maintenance robots and these had been put into a state of low alert two centuries ago and would respond only to direct orders from

a human being. But they weren't nearly so bright as the Sister type and, while a single word was enough to set them in motion, it required a great many words to make them understand what he wanted. And the Ward Sister refused to let him into the cage until a full load of Cleaners had tested it first. These delays, by forcing him to think coherently, had a diluting effect on his original feeling of panic, but even he knew that his actions were not those of a sane man.

During the waiting periods between ascents he read parts of the ledger, and now knew what the Emergency had been. A war. According to Pellew it had lasted five months and had been fought to the bitter end by opposing automatic devices, because after the first week no human being could have survived on the surface…

Ross wanted out. Desperately, he wanted away from the unhuman attentions of robots and the sterile death of the wards. He did not expect to find living people on the surface, but he would settle for living things. Trees, insects, grass, weeds. And a sky with clouds and a sun in it and cold, natural air on his face. He didn't think there would be any survivors, but he never stopped hoping…

Each leg of the journey upward was the same. With the Ward Sister at his heels he would stumble out of the cage, yelling for a robot native to the section. When one appeared, invariably another Sister, he would ask, "How many human beings alive in this section?" When the inevitable reply came back he would pause only briefly, then say, "Where are your maintenance robots?" Within minutes he would be surrounded by a mechanical menagerie of repair and construction robots, all ticking at him or asking for clarification of their instructions in voices that were so human that it made Ross's flesh creep. Eventually they would be made to clear the way up to the next section.

Once he came to a level which he recognized as being the lowest section of the hospital of his pre-Sleep days. In this section the dust of centuries lay like gray snow in the corridors and the robots he summoned became the centers of choking, blinding dust storms.

The first level, which was less than one hundred feet beneath the surface, was a shambles. Lighting, elevators, even the native robots were so much wreckage. Great, gaping cracks grew across walls and ceiling like jagged vines and there had been many cave-ins. But there was also a tunnel, sloping upward steeply and with a fuzzy patch of gray light showing at its other end. In the robot's spotlight Ross could

not tell whether the people of this level had dug their way out before they died or someone had dug down in an attempt to escape the holocaust above. He began climbing frantically, the Sister — whose three wheels were not suited to such a rough surface — falling slowly behind him.

He had to rest once, lying face downward on a slope of loose earth, rock and what looked like pieces of fused glass. There was a peculiar tang in the air which his nose, still inflamed by dust, refused to identify. With the lip of the tunnel only a few yards ahead, the dull, gray light was all around him. Ross thought that it was just his luck to pick dusk, or shortly after dawn, as his time to climb out. After a few minutes he pushed himself to his feet and began, wobbling and sliding, to run.

Ross looked slowly around him while the dark gray fog drove past, blackening his arms and clothing as he watched. To the limit of visibility, which was about fifty yards, the ground was dark gray and black — the smooth, shiny black of partly melted rock and the sooty gray of finely divided ash. The ash swirled and drifted from trough to trough in that frozen ocean of glass, or eddied upward to become the dry fog blowing past him. The sun was high in the sky, a dull red smudge with an enormous ring around it, and the sound of waves reached him from the half-mile-distant beach.

He had done a lot of swimming on that beach, alone, with other students, with Alice. Yelling and floundering and splashing for hours on end; "playing" was the only word which described that activity. And the sea had played, too — a trifle roughly, at times, considering that it was the vast, all-powerful mother of life on the planet and one of her most recent offspring was giving her cheek.

Ross began moving toward the beach. His brain seemed to be frozen with shock, because no time elapsed between the decision to go and his arrival.

The sun was a brighter red and visibility was up to half a mile — the breeze blowing in from the sea was relatively free of ash. But the great rollers which marched in were mountains of ink, and when they broke and roared, foaming, up the beach, the foam was dirty and left streaks of black and gray on the sand. The tidal pools were as warm and as numerous as he remembered, but all were lined by a thin film of black and nothing moved in them. There was no seaweed, no evidence of the green scum which collects in stagnant pools, nothing

inside the most recently washed up seashells.

They had killed the sea, too.

Ross sat down on a rock which had been smoothed by the sea and given a mirror polish by the tiny sun which had come into being here, for a split second, over a century ago. He sat for a long time. It began to rain and the ash clouds which had obscured his view inland settled to the ground, disclosing a line of robots coming over the shoulder of the hill containing the tunnel mouth. He watched them for several minutes, wondering whether he should take off his ridiculous toga and dive for the last time into the breakers. But Ross was against suicide on principle. The world had ended, he was probably the last living human being, and the future held nothing but loneliness or madness. So it couldn't be hope which made him sit motionless while the dirty gray foam beckoned, for that had become a meaningless word. Perhaps it was because Ross was only twenty-two.

When the robots arrived and performed a neat encircling movement, the Ward Sister said, "You must return to bed, Mr. Ross." Seconds later a Cleaner lay his weakly resisting body along its back, pinioned him with five sets of metal arms and rolled back toward the tunnel mouth.

It took Ross several minutes to realize that he had undergone a change of status. The Ward Sister, it appeared, had heard him coughing in the ash-filled air at the mouth of the tunnel, had noted the many cuts and grazes on hands and legs he had acquired during the climb, and these, taken together with his somewhat abnormal recent activities, had caused the robot to react in accordance with its basic programming. He was no longer a Doctor in charge called "sir," but a patient called "Mr. Ross." And patients did what Ward Sister told them to do, not the other way around.

He was confined to bed for seventeen days.

Until each tiny cut was healed and the last square centimeter of scab dropped away, Ross's every order was ignored. When sheer impatience made him abusive, that also was ignored, as were most of his threats.

The one threat which was not ignored occurred on the second day. Ross had been throwing a tantrum over not being allowed to exercise for a few hours every day. He had ended by observing, at the top of his voice, that such an inhuman confinement was likely to drive him around the bend, that it could very well force him into taking his life, perhaps, through sheer boredom. To this the robot had replied that physical examination showed he was in a severely weakened state, due to both recent revivication and his too-exhausting trip to the surface, and that prolonged rest was indicated. Also, since the danger of Ross's injuring himself had been mentioned as a possibility — the chief reasons cited being loneliness and boredom, two conditions not likely to improve — it was the Ward Sister's duty to guard him against this danger for the rest of his life.

Just then Ross did not want to think of the future. He wanted to chat about unimportant things such as how he should have his hair cut and why some items of his clothing had deteriorated while others had not. But Ward Sisters were supposed to be too busy to chat with patients while on duty, and Ross was now a patient. Three or four times a day he received a few words of encouragement, and that was all.

Ross did not like the pictures he saw when he closed his eyes, so he kept them open as much as possible, staring at the ceiling, moving them slowly around the room, or squinting at the three-inches-distant bed sheet in an effort to resolve its weave. But the ceiling was white and free from discoloration, the room's fittings were bright, angular and cast no shadows, and trying to make his eyes behave like a microscope only gave him a headache. There were no angles or shadows or tricks of light on which his mind could build the nice, harmless pictures which would keep him from dwelling on his present terrifying position, and so he would be forced to look at the robot.

A smooth, upright ovoid with one fixed and one rotating eyepiece, and to Ross's mind a cybernetic miracle by virtue of its compactness alone. A servant, guardian and trained nurse, placed in this position of responsibility because of a shortage of human nurses, which had later

become a shortage of human beings…

At that point the pictures which he did not want to see would come, whether his eyes were closed or not.

Pictures of Alice in crisp blue and white, serious, dedicated, untouchable. With her short hair, unplucked eyebrows and thin lips, her face had resembled that of a studious young boy. When he had discovered that she was neither unapproachable nor untouchable — toward himself, anyway — he had once told her that she looked like a boy. They had been swimming and Alice's dark brown hair was plastered tightly against her scalp, increasing the resemblance. A small, wet, feminine hand had made contact with his dripping back in a slap which stung, in memory, even now, and he had had to add a hasty qualifier to the effect that he meant from the neck up. Strangely enough, it had been later in that same day that he discovered that her lips were not thin, that they only seemed that way because she habitually kept them pressed together. Alice worried a lot, about examinations, her patients, about many trivial things which a less dedicated type would have ignored. She had very nice lips.

Pictures of Alice stretched on the sand behind the low rock which sheltered them from the wind, the heat of the sun covering them like a too-warm blanket. It was a picture in five sensual dimensions: the warm, damp smell as the sun blotted up the last remaining sea water from swimsuit and hair; the sensitive, tanned face looking up into his with eyes which seemed to grow larger and softer until he could see nothing else; then the kiss which, no matter how long, never lasted long enough; sometimes then she would sigh and murmur softly to him — but he rarely heard what she said, because the silly girl kept playing with his ears every time she tried to tell him something. They would kiss again and the emotional gale rising within him, the roaring in his ears and the mounting thunder of his pulse, would almost drown the slower thunder of the breakers, the great dead, filthy breakers which still crashed against a black and lifeless beach…

No matter how hard he tried to avoid it, his mind always slipped back into the same pit of despair. Until this moment "loneliness" had been a word with only a shadow of meaning. Until now nobody had known the crushing sense of loss and grief of a man whose loved ones, friends and everyone else have been taken away to leave him alone on a dead world. The fact that, by his own subjective time, only three or four days had gone by since Alice had kissed him a tearful good night and Pellew had growled his best wishes, and Ross's world had

contained a crowded hospital which was part of a civilization covering a planet whose every square yard had teemed with life of some sort, made his loss that much more terrible.

Many times Ross wanted to die. But he was too young and healthy to die of grief, and any more positive approach to dying would certainly be checked by the Sister. And so his despair found its lowest point and, because the only way to go from there was up, it began to recede. Not that he felt hope or anything like it; it was simply an acceptance of his present circumstances and the feeling that perhaps he should look more closely into them before he made a more determined effort to end it all. After all, he had a hospital, hundreds of robots and he didn't know what else at his disposal and taking stock seemed like a good idea. Besides, it would keep his mind occupied.

At about the same time Ross made this decision he discovered that while the robot continued to ignore all his orders and/or invective, it would accede to reasonable requests of the type which convalescent patients could be expected to make. The Ward Sister did not forbid him to read.

The first book Ross asked for was, of course, Pellew's diary. He read it through carefully from beginning to end, then reread it in conjunction with the green folder. Now he knew exactly what had happened to the hospital, and when. Pellew had begun his diary as the usual personal record of events, but toward the end it became a series of orders and suggestions directed toward Ross himself, when the doctor had realized that he was likely to be the only survivor with medical training.

Ross requested books which Dr. Pellew had suggested he study. Works on genetics for the most part, which must have been heavy going even for the good Doctor. For his own information he asked for books on robotics, and one of them turned out to be a popularization which he could just barely understand. He also began to make plans for the time when the Sister would stop calling him "Mr. Ross."

Then one "morning" when the lights had come on after his eight-hour sleep period the robot placed three food cans beside him and asked, "Have you any instructions, sir?"

Ross said yes with quite unnecessary force, and while he was struggling into a fresh toga he began issuing orders. Some of them, he feared, were pretty tall orders. First, he wanted the case histories of

the people who had died between the time of Pellew's death and his own awakening. He was not hopeful of finding survivors in Deep Sleep, because the Sister had stated that there were none. But Pellew's diary had said that Ross was the only survivor with medical training, which implied that there must be other survivors without training, and he wanted that point cleared up. Second, he asked for a census to be made of all the operable or repairable robots in the hospital, their numbers, types, relative intelligence and specialties. Any who had been placed in a state of low alert by humans prior to their deaths were to be reactivated. Third, he wanted a report on the water, food and power supply position.

Ross paused. From his reading he knew that the Sister had been relaying his instructions as he had spoken them to the other robots in this level, who, because Sister's transmitter could not punch a signal through a mile of solid rock, would relay them physically to the higher levels.

He took a deep breath and went on: "You will detail cleaning and maintenance robots to repair and clear the damaged upper levels, including where necessary elevators and communication circuits. And I want a small area of the surface cleared of ash and soil samples taken at one-foot intervals to a depth of twenty feet. I'll require samples of the air and sea water as well."

Ross hesitated, then asked, "Does your training, I mean programming, enable you to do an air or soil analysis?"

"No, sir," the Sister replied, "but there are Pathology Sisters capable of doing so."

"Very well, put them onto it..."

He broke off as a Cleaner rolled in, deposited a small pile of folders beside him and began making his bed. The notes Ross had made while lying down were knocked to the floor, and the robot picked them up and thrust them into its built-in wastepaper basket.

"I want those back!" said Ross angrily. When the sheets had been returned, slightly crumpled, he added, "I'll do my own tidying up from now on. No Cleaners are to come here unless I send for them."

When the robot had gone Ross looked through the case histories it had brought. There were five of them, all relating to patients suffering

from conditions which in his time had been considered fatal. Like him, their 508 forms bore the words treatment successful, to BE REVIVED PERMANENTLY IN ——— YEARS FROM THIS date — the number of years ranged from forty to seventy-five. Unlike his own, they were all stamped died during revivication, and in all cases the attending physician was down as Ward Sister 5B. In spite of himself, Ross shivered. For the first time since meeting the robots on the day after his awakening, he felt afraid of them.

"Why did these patients die?" he said, as steadily as he could manage. "Tell me the exact circumstances."

The Sister ticked a couple of times, then said briskly, "Dr. Pellew's orders were to awaken all Deep Sleep patients when their revivication was due, and he did not cancel or modify these orders prior to his death. We therefore revived all patients as they fell due, using robot assistance. Specifically, I attended to the revivication while two Cleaners restrained the patients so that they would not injure themselves by moving too suddenly or too soon. On awakening the patients displayed extreme agitation and tried to break free of the robot arms which were holding them immobile. Their struggles were of sufficient violence to cause internal damage from which they subsequently died."

Remembering his nightmares in which the thin, metal arms of cleaning robots had gripped his chest, head and arms, Ross could understand the extreme agitation of those patients. He knew now that they had been trying to keep him from injuring himself, but then he had been convinced that something was intent on crushing the life out of him. But at the thought of those five patients dying like that, patients over whom Doctors like Pellew and Hanson had labored for so long to cure and preserve so that their race might go on, Ross gritted his teeth. With five people — three of them had been female — and almost unlimited robot labor, much might have been accomplished. In time they might have filled these echoing, empty wards, might have spread to the surface and begun filling the world again. Before that happened Ross would have had to work himself to death, probably, bringing children into the world, anxiously guarding the health of its tiny population, coordinating human and robot effort and generally behaving like a frantic mother hen — that was what Pellew had had in mind for him, according to one of the last entries in the diary. It might not have been an entirely pleasant future, but Purpose would have obliterated Despair and loneliness would have again become a word which had only a shadow of meaning.

"You stupid, blundering machine!" he raged suddenly. "Didn't you know they were long-term patients, from the prerobot era, and bound to be frightened by such an awakening? And why did you go on reviving them, letting them die, killing them! After the first patient died you should have tried —"

"My previous experience had been with short-term patients who showed no surprise at their awakening being supervised by a robot," the Sister broke in. "And Dr. Pellew had promised to issue instructions regarding the six long-term patients, but he died before doing so. There are three possible reasons for his neglecting to do so: that he did not know what instructions to give; that he intended living through until the first patient was due and awakening him personally, because he had stated several times to me that he was a very lonely man; or that he knew what orders to give but simply forgot to give them, he being very old at that time and tending to forget things..."

"He wasn't doddering," said Ross angrily. "I've read his diary I know,"

"... But we had definite instructions to awaken these patients," the Sister continued, as if he hadn't spoken, "and had therefore no choice but to do so. This despite the fact that our basic function is to serve man and save men's lives. We kept reviving the patients in the hope that some of them would survive the process, but none did. Then we came to you and were faced with a dilemma.

"To a robot," it went on, "allowing a human to remain in Deep Sleep forever is the same as allowing him to die, and bringing one out of Deep Sleep was the same as killing him. And if we killed you, who were the last man, we would both fail in our purpose of saving human lives and at the same time remove our other reason for existence. We could not serve Man if there were no human beings left. That was why, when we commenced revivication on you and you began to display the same symptoms of increasing mental distress and violent muscular activity as had the others, I halted the process and returned you to Deep Sleep. In this I exceeded my instructions, but it seemed the only way possible at the time of not killing you..."

The Ward Sister became technical at that point as it went into details of conferences with various repair robots. As the most intelligent single robot in the hospital — the last modification produced by the great cyberneticist Courtland — the responsibility for

solving the dilemma naturally fell on it. Its purpose in going to the repair robots was to have them try various modifications and extensions of its memory banks in the hope of emulating the creative or intuitive thinking used by humans in order to solve the problem. Whether the resultant modifications helped or not the Ward Sister had no way of knowing, but after several months and another halted revivication had passed, a new method of attacking the problem suggested itself…

'For a successful awakening I needed at least one human being in attendance," the robot continued in its brisk, feminine voice, "and by breaking down the function of the human during such a time into separate parts, converting the large problem into several small ones, I arrived at the solution. The human had to be seen, heard and had to assist the patient physically to do some gentle exercise. I knew of one of Dr. Pellew's ornaments which resembled a human being, and could be painted to increase that resemblance. I had access to tapes containing Dr. Pellew's voice, which were edited to fit the situation, and the exercise was provided by causing you to go into the corridor for your file, which also began the process of reorientation. It remained only for us to keep out of sight until you understood what had happened while you were in Deep Sleep, which was supposed to be after your reading of Dr. Pellew's diary. Instead, you ordered us to come out —"

"You've done very well," said Ross heavily. "Mr. Courtland would be proud of you."

"Thank you, sir."

"But you shouldn't have bothered."

The Sister began ticking at him.

Ross turned suddenly and strode out of the room, along the corridor and up the sloping ramp until he came to a compartment with maintenance on the door. With the Sister trailing a few yards behind, he entered and began searching the tool lockers until he found a long-handled wrench, which weighed about eight pounds and was over two feet long.

"I want you to do something for me," Ross said in a mild voice. "I want you to stand still." Then he swung the wrench against the robot's smooth metal casing with all his strength.

The blow landed with a shock which jarred him to his heels and a crash which was the loudest noise he had heard since awakening. It battered in one of the flush panels, bludgeoning through the mass of delicate surgical and medical gadgetry underneath. From the wound multicolored blood spurted as underlying drug containers shattered, and three syringes on extensible arms sprang out and sagged downward. Ross swung again.

The second blow caused only a shallow dent, because the robot had moved away, and the third one missed entirely.

"Stand still!" said Ross thickly, raising his metal club again and aiming for the robot's lenses. One of those last five patients had been a nineteen-year-old girl. An eye for an eye, he thought with a cold ferocity, and for a girl's life a dead mass of scrap iron…

"Mr. Ross," said the robot, retreating again, "you are not behaving in a sane —"

"This is a scientific experiment," said Ross, a little breathlessly, "to determine whether or not you can feel pain. And I am not a patient, so call me 'sir.' "

That was important, Ross told himself. If he gave good, logical reasons for wanting to smash it into its component nuts and bolts, he might get away with it — he would still be the boss. But once let it start thinking of him as a patient and then it would be the boss. He advanced again, silent and blank-faced, trying to hide his killing rage behind a facade of scientific curiosity. He had the Sister in a corner now.

One of the robot's body panels opened briefly. Ross did not see or feel or smell anything. His wrench hit the floor an instant before he did, and he didn't feel that because by that time he was asleep.

When Ross came to there was a big, multijointed angular object resembling a surrealistic spider working on the Ward Sister. Several of its panels had been detached, revealing a considerable amount of internal circuitry, and the overall effect seemed vaguely indecent to

Ross. The Sister spoke first:

"The data which you required could have been obtained by a verbal request," it said in the brisk, pleasant voice it always used no matter what the circumstances, "so that your experiment, which has caused me a temporary loss of efficiency, was unnecessary. I do not feel pain, or pleasure, in the manner of a human being although I am trained to observe and treat its symptoms in patients. Primarily I have been built to serve Man and anything which hinders my doing so causes me a robot equivalent of pain and anything which aids me toward that end is a form of pleasure. To expand that, pleasure lies in working as hard as possible at the direction of human beings, maintaining myself at peak efficiency to further that end, and avoiding all situations likely to bring about a loss of efficiency when such avoidance will not endanger a human."

"So you got a kick out of knocking me over just now?" Ross said woozily. "An anesthetic gas, wasn't it."

"Yes, sir."

Ross shook his head. He was beginning to feel ashamed of his recent berserker rage — especially as it had been such a dishonest, camouflaged sort of rage — against this machine, which had, after all, been doing its best. He felt that he should apologize to the Sister, except that apologizing to a machine struck him as being ridiculous.

Awkwardly, he said, "Then I hurt you by causing a temporary loss of efficiency, and by defending yourself against a possible permanent loss of efficiency you gained pleasure. That makes us even."

"We are not competing, sir," the robot said. "You do not fully understand the position. All the robots here are your servants, because obeying you and protecting you gives us the only pleasure we are capable of experiencing. It is a matter of basic programming. If you should ever die that would hurt all of us very much."

Ross felt a prickling among the short hairs of his neck. If you should ever die… The robot must surely know that all human beings died in time, so why should it use that particular form of wording? This posed an interesting psychological point, he thought, and one which he must go into thoroughly at some later date. An electronic brain which made Freudian slips was something to think about.

He climbed slowly to his feet and stood for a few minutes until a slight dizziness had passed, then walked across to Sister and the repair robot.

"I shall be finished in twenty minutes," said the repair robot in a deep, masculine voice which matched its functional but unbeautiful body. "The damage is superficial."

Ross nodded. He said, "Most of the books down here are medical texts, and medicine looks like becoming somewhat of a dead science at the moment. But there used to be a good patients' library on the second level and it may still be there. I'm going up there to start learning something useful…"

As he left the maintenance storeroom a Cleaner fell in behind him to escort him to the second level and to guard him against any dangers that might threaten, the most likely danger being a sudden suicidal urge on the part of himself, apparently. Ross smiled sardonically and began to question the Cleaner about its duties. Keep the servants happy, he thought.

7

During the month which followed Ross kept the robots very happy indeed. Most of the cleaning and repair robots were engaged in rebuilding the first level and he found jobs of some kind for the others. He was so busy making work for the robots and advancing his grandiose — and essentially hopeless — long-term plans toward completion that he hadn't time to think about himself, which was exactly how he wanted it.

Gradually the reports he had asked for came in. He found that mechanically the hospital was in perfect working order, but that the contents of the blood bank and other medical supplies which had been in common use had deteriorated. The power supply was atomic and therefore no problem, there were food stores on every level, and although the water supply was low at the moment, more could be processed from the ocean now that it was no longer radioactive. Under its thin coating of ash the soil was rich, but dead.

A diary found in the debris of the first level gave him the explanation.

During the first three days of war more nuclear weapons were exploded on the Earth's surface than had been believed to be in possession of the combined armories of the world, and during the first month there was little slackening off. By that time nothing lived on the surface. Animal life perished first, then insects and finally the plants. Despite their high radiation tolerance, the bombs were too many and too dirty and the fallout claimed them. The fantastic number and frequency of the explosions made it plain that the bombs were being manufactured and launched from hour to hour, that the work was being performed by servomechanisms and that the bombardment would continue until those servos were knocked out or their available sources of raw material ran out. And so the radiation pushed deeper, sterilizing all life from the soil — the earthworms, the larger microorganisms, the deepest, most tenacious roots, all perished.

Outwardly there was very little change in the areas not directly affected by the explosions. The long grass waved in the wind and trees still stood proudly against the sky, but the greenery had taken on a September hue and it was only mid-April. And at sea the war was less spectacular even though as many nuclear devices were exploded underwater as had been loosed on the surface — many of the launching bases were on the sea bed and the oceans teemed with

unmanned submarines. A lot of dead fish were washed up and lay on the beaches for a long time, not rotting exactly, because the organisms responsible for the process of putrefaction were dead also, but simply drying up or falling apart until they were washed or blown away.

The sea was dying of radioactive poisoning, the land was dead already and at night the air glowed. There were too few survivors underground to check what happened next, even had they been willing to sacrifice their lives in trying.

The fires started by lightning or still-smoldering debris took hold and spread, everywhere. Dead vegetation does not retain moisture for long, so that even a heavy rainfall served only to slow that fiery advance. Across fronts hundreds of miles wide the conflagrations raged, sweeping first through countries and then continents with a complete disregard for natural and national barriers alike, and spewing great masses of ash and smoke into the upper atmosphere. The offshore islands held out briefly, until deluged with sparks from a mainland firestorm, and in the Southern Hemisphere the fire was slow to take hold. It was winter there and in the equatorial regions the vegetation grew in swampland or was kept wet by the rainy season. But the great tracts of once-lush jungle were dead and, above the waterline, drying. When the dry season came they went the way of all the other combustibles on the surface of the planet.

Having died, Ross thought grimly, the Earth had cremated herself.

He did not feel as bad as he had expected to after reading that diary, and realized that discovering the scientific explanation for the surface conditions came as an anticlimax to his first sight of them two months ago. Remembering that constant fog of ash and soot, which had been less dense over the sea and when rain fell, Ross began to form certain conclusions.

Although very finely divided, the ash was heavier than air and its fall was sometimes helped by the rain. When it fell on land it formed a sticky, mud, which, when it had dried out, was blown into the air again. Any that fell into the sea remained there, so that eventually the oceans would absorb it all. Probably the process would take many centuries, but in the end the air would be clear again. The ocean would stay dirty, and there was nothing that Ross could do about it. His final conclusion was that he should return his mind to circumstances over which he had some control, and the sooner the better.

There were three hundred and seventy-two robots, three large repair shops and a considerable variety of spares at his disposal. For Ross's purpose it wasn't nearly enough, and so he put the matter to Sister. Because it was only a robot he used simple language, cool logic, and took his argument forward in easy steps. At least, he started that way…

"I am the only human being left in a hospital whose robot staff is trained to care for thousands of patients," Ross began quietly, "and it follows that, with the exception of yourself and a few Cleaners, the staff will have nothing to do, medically speaking. I have been assured, both by you people and from my reading, that a robot with nothing to do is a very unhappy hunk of machinery indeed. But if I am to keep you busy, if you are to do the jobs I have planned for you, the robot nursing staff will have to learn new skills and subject themselves to drastic physical modifications. They must learn these skills in addition to their existing medical training, because there would be the possibility, a very slim one, I admit, that their medical skill might suddenly be required. Before I go into details, however, are these alterations in structure and programming feasible?"

The robot was silent for about three seconds; then it said, "I have communicated your question to the senior maintenance robot. Structural modifications are no problem, but the ability to learn is governed by the capacity of the memory banks. A full answer is possible only if we know the details of the work you require done."

"Very well," said Ross. "Get that maintenance robot down here. I know you can transmit vision as well as sound, but I'd feel more comfortable if he was right here. I've some sketches and illustration I want you both to see."

He went across to his desk, opened the big ledger, which over the months had grown into a cross between a diary and a scrapbook, and sat down. The Ward Sister stood behind him and shortly afterward the maintenance robot squeezed through the door, its blocky, multijointed body making the room seem suddenly crowded.

"What I have in mind is this," Ross began, without further preamble. "Robots of the Cleaner and Ward Sister type to have their wheels replaced by treads similar to those on the diggers, also whatever modifications necessary added to protect them against rain or drifting ash, so that they can operate for long periods on the

surface. I know that they have infrared vision, so that working at night or in bad visibility will not hamper them. In addition I want them fitted with a means of detecting metal, digging it out and transporting it back here. These sketches will show you what I have in mind. But this is only the first step.

"The metal is to build more robots," Ross continued quickly, "who will go looking for metal to build yet more robots. For my purpose I will require thousands of robots, working hard and continuously, and the metal

available in the ruins of the nearer cities will not be sufficient. Eventually we may be forced to mine and process the raw ore. But before that stage is reached I want to have robots searching the ocean bed, and the search extended into other countries by amphibious and airborne models..."

Ross was becoming excited in spite of himself. He was turning pages and jabbing his finger at sketches which he had not meant to discuss at this early stage, and babbling about submarines, helicopters, Archimedes and jet engines. He was leaving his audience behind, yet he couldn't stop himself. In a disjointed and nearly incoherent way Ross was outlining what was to be his life's work, the goal which would keep him sane and make him as happy as it was possible to be in his position, and suddenly he could no longer keep his hopes bottled up.

"... I want the whole damned planet searched!" he went on wildly. "Every square foot of it. Somewhere there are other hospitals like this one, perhaps with patients still in Deep Sleep, or undersea bases which survived the war. It happened here so it could happen somewhere else! That is why the search robots must retain their medical knowledge, and extend it wherever possible. The descendants of those survivors are likely to be in bad shape.

"And if you should come on another Deep Sleep patient, I will supervise the awakening..."

Both the robots were ticking at him, a sure sign that they were hopelessly confused. Ross broke off awkwardly, then, in a more subdued voice, began to question the robots regarding the problems of converting his nursing staff to heavy industry.

And there were problems, all right. They lay solidly, one on top of

the other, like a brick wall. One of the chief difficulties lay in the limited capacity of the robot brains to store new data. After basic programming a robot possessed the ability to learn by experience — in a very narrow sense, of course — because a small proportion of its memory bank was deliberately left unfilled. But this tiny fraction was not enough to contain data on a whole new specialty, and the result would be a cross between a very smart nurse and a hopelessly stupid miner. The answer was to cancel a large part of its medical programming, but Ross did not want to do that.

Another problem was the difficulty in putting ideas across to the repair robot. To it an illustration was just so many lines on paper; it had no understanding of perspective or of the solidity which they represented. Ross had to go over every line individually, explaining that this one was the radio antenna, that this particular squiggle was the towing hook and this series of parallel lines represented part of the caterpillar treads. Even then he could not make it understand properly. His frustration increased to the point where he felt like shaking it until its insides rattled or going at it with the two-foot wrench in an attempt to beat some sense into it, even though he knew that either course was likely to have the opposite effect. Finally he lost his temper completely and intemperately told it to get out of his sight.

In its maddeningly emotionless voice it requested clarification on the term "hell" and directions for getting there.

Ross closed his notebook and gently thumped the side of his head with a fist. "Why are you so stupid?" he said wearily. "You're supposed to be the mechanical wizard here, yet Sister, who is only a nurse, seems to get what I'm driving at better than you do —"

"It is a matter of programming, sir," the Ward Sister broke in. "Maintenance robots cannot abstract data from lines on a chart, such as pulse and temperature graphs, or from X-ray pictures as are the nursing robots —"

"I read circuit diagrams…" began the repair robot.

"Let's not start a fight," said Ross drily. "Just tell me why one of you seems more intelligent than the other."

There were two reasons, and as Ross listened to the Ward Sister's reply he realized that he should have seen one of them without being told. Ward Sister 5B was the last, most recent modification built by

the great Court-land. Robots were not supposed to be able to think creatively, but Ross could not forget that this particular Sister, when faced with the dilemma of possibly killing the last human being, had achieved something remarkably like creative thought. It had been too little and too late, but an achievement nonetheless. The second reason was simply a matter of increased capacity for memory storage, as represented by the large box riveted to Sister's ovoid body just above the rear wheel struts.

Which meant, among other things, that Ross could have his nurse-miner or even nurse-mining-and-repair robot combinations, merely by increasing the memory-storage capacity. To be sure, he put the idea to the senior maintenance robot, and received the reply that there was nothing against such combinations providing the memory bank was of sufficient capacity.

"Then what's all the fuss about?" Ross demanded angrily. "Why didn't you tell me it was only a matter of —"

"The normal type of robot," put in Sister at that point, "is not capable of volunteering information."

Listening to her, Ross had to remind himself that machines were not supposed to be capable of smugness, either.

"Then it's time we had a few more super-normal robots," he said seriously. "I've read Courtland's notes on the 5B modification, and from the little I understand of them it appears that Sister here has had a small change in circuitry which, when she is faced with a problem, makes available data on all similar problems which have been solved previously… No, that isn't what I meant. Courtland says that she has a choice of answers to any problem, and if she makes the wrong answer that error is filed as a datum and she will never make exactly the same mistake again.

"Anyway," he ended, "is it possible for 5B's modification to be reproduced in the other robots?"

The answer was yes, provided the senior maintenance robot was allowed to dismantle 5B to do so. When he heard that Ross felt oddly concerned about the Sister. Like any lay friend of a patient, he wanted to ask if the operation was likely to prove fatal, and similar anxious queries. He realized that Sister had come to mean a lot to him in the past few weeks. Whether deliberate or otherwise, her refusal to grant

him a moment's privacy either day or night, while infuriating and at first downright embarrassing, had kept him from feeling too badly the loneliness of his position, and she was the smartest robot he had. The fact that her concern for him was an artificial, built-in feeling did not seem to matter.

Ross had difficulty in phrasing his next question, but the Sister answered it without trouble.

"The directives against harming another robot are only slightly less strict than those against damaging a human being," she said. "During the dismantling and reassembly I should incur no loss of memory or function."

"Good," said Ross, "then here is what I want done. First, all robots, both existing and those which are to be built, to have the capacity to store data on at least three specialties, with provision for further learning. Next, all robots are to be made capable of abstracting data by every aural and visual means. That includes the spoken word, radio, photographs, circuit diagrams, charts, graphs, contour maps, astronomical observations and the meteorological phenomena encountered in air and sea navigation. And when they are capable of doing this I want them to absorb data in all fields until they can't hold any more, then extend their memory banks and go on learning, indefinitely. Do you understand my instructions?"

"Yes, sir," said the maintenance robot.

"You require a robot which is unspecialized," said Ward Sister, and added, "Such a mechanism may be too large to operate inside the hospital."

Ross hadn't considered that angle, but it wasn't important. He said, "I'll require hundreds of such robots, and we can stable them on the surface. Any other objections?"

The repair robot said, "The building program as outlined is possible, but I require a breakdown of your instructions and the sequence in which you want them carried out."

Ross groaned inwardly; he hadn't considered details himself yet. But he was becoming expert at talking with authority on subjects about which he knew very little…

A few hours later he was present when the senior maintenance robot and another of the same type scattered pieces of Sister all over the machine-shop floor. Ross wasn't squeamish about dismantled machines, but the way 5B kept carrying on a conversation while lying about in that condition gave him the creeps. In a surprisingly short time the senior had succeeded in doing for the other repair robot what Courtland had done for Sister, and in an even shorter time the newly enlightened one had returned the compliment. They put Sister together again in no time at all.

Ross now had three robot geniuses on call, and he knew that within a few weeks the Courtland modification would have been extended to all the robots. It should have been a great moment for him, but instead he felt strangely let down, for despite his recent intensive reading on cybernetics, he had not understood a single thing which he had seen done.

Analyzing his feelings, Ross came to the conclusion that it was simply a matter of his pride being hurt. He did not want to feel that a machine could be smarter in any subject than he was, although it was plain, when he thought about it more deeply, that every robot in the hospital would soon be smarter than he was on any subject. He had to remind himself forcefully that they were only tools. Complex, of course, but still only gadgets designed for his use or convenience. The idea was to use, not try to compete against, the things.

Only briefly did he wonder, with that uneasy fluttering in the pit of his stomach, if he knew what he was doing. The first obvious change was that every robot acquired a trailer. Mounted on two wheels and joined to the main robot body by a flexible coupling which also carried a bundle of connecting cable, this was the housing for the extra data banks Ross had ordered. His idea had been to raise the general intelligence level of the robots in order to make his later, and more complex, instructions understandable to them. Instead, he often found himself having to explain the simplest, most obvious things — obvious to a human being, that is — while they fairly romped through items which to Ross had seemed extremely difficult. Gradually he found himself being forced into the position of a coordinator rather than a teacher, but that did not mean that he had less work to do.

On the surface a large transparent dome was built to house the first Miner, and the fifty-odd robots engaged in its construction. Higher on the hillside he built a smaller one, which enclosed a chair, some communications equipment and thirty square yards of soil from which the ash had been cleared. When it rained heavily and the wind was just right Ross could just make out the sea, but usually he looked out at a dirty gray fog and a dull, hot sun with a red ring around it. It was very warm on the surface, even at night, and Ross guessed that the sooty atmosphere was responsible for the general rise in temperature by decreasing Earth's albedo.

Although he kept the soil inside his dome wet, and it got all the sunlight there was going, nothing grew.

Between working on methods for programming the search and mining robots to accept data in foreign languages — some of the places they would be going, English would be neither spoken nor printed — he set his longer-term plans in motion. The principles of flight he demonstrated by flying paper airplanes until the robots engaged on that project were able to understand the literature available. Trying to put across the idea of buoyancy in water was more difficult. Because his model floated, the robots seemed to consider the water a form of mobile ground surface, and they kept trying to walk on it. The first couple of times, Ross laughed.

As the Miner neared completion he instructed another team of repair robots to design a multipurpose model which would not have to be as large as a railway locomotive. He gave them the few cybernetics books he could, together with some notes Courtland had made for further modifications. The following progress reports were disappointing and later ones grew as unintelligible to him as Courtland's notes had been. Ross kept them at it, partly in the hope that they would fulfill their instructions and partly to see if it was possible for robots to think subjectively.

Then one day, as he was inspecting the digging vanes of the new Miner, the ground stood on its end and he buried his face in damp, sooty earth. When he came to Sister was calling him "Mr. Ross" and putting him to bed, and he had to take a ten-minute lecture on the stupidity of human beings who insisted on working like robots, continuously and without sufficient rest, until their body mechanisms — which could not be repaired or replaced — became dangerously overstrained. His loss of consciousness on the surface, according to her diagnostic equipment, had been caused by mental and physical

exhaustion and a long complete rest was indicated.

And by complete rest, Sister meant exactly that. Since acquiring the trailer which had more than quadrupled her data-storage capacity, Ward Sister 5B had become very difficult to outsmart. This time "rest" did not mean a change to working in a horizontal position; he was not allowed to make notes or study technical volumes.

She insisted on bringing him a selection of light, romantic fiction!

It had been almost a year since his supreme authority had been usurped like this, and it both angered and frightened him. He had urgent work to do and the thought of lying in bed without something to occupy his mind nearly threw him into a panic. The books he had been given only made things worse, describing as they did backgrounds and situations which were no longer a part of the real world, and were therefore extremely painful for him. There were no sun-drenched lagoons fringed with palm trees, no smell of freshly cut grass, no parents worrying about the current infatuation of their daughter. Ross would have given all he possessed or ever would possess to be even in the losing corner of an eternal triangle.

He stopped reading those books, not because all the vistas they described had become one — smoke and ashes lit by a red sun — but because they were about people. It was almost a pleasure when Sister ticked him off every morning for overworking, or lectured about the advisability of taking rest in addition to his sleeping period.

Ross found himself wondering why exactly he had been working himself to death. He had his whole life in front of him. What was the hurry?

If there were survivors underground somewhere, they would be eleventh- or twelfth-generation, and in no immediate danger of extinction if they had managed to stay alive until now. Similarly, there was no frantic hurry about finding any who were surviving in Deep Sleep; they would keep indefinitely. Ross was understandably anxious to contact any other survivors that there might be, he wanted to find and talk to other human beings in the worst possible way, but even that did not explain the way he had driven himself lately, at least not altogether. There was something else, some deeper, more driving urgency. It continued to drive him even when he was asleep.

He was running through ash and smoke toward a trim single-story house seen through the trees of its surrounding garden and the ever-present smoke. There were the sounds of children playing — two, or maybe three — and a woman singing over a hammering noise which was coming from the back of the house. But no matter how fast he ran, the house with its unbelievably green trees moved away from him and he was running into an eternal black snowstorm. Or he was swimming frantically through an oily black ocean toward a shoreline of low, grassy-topped dunes which were not quite tall enough to hide the roofs of houses inland, only to see these symbols of life, both plant and human, swallowed up in the dirty, acrid-smelling fog.

There were many variations but the theme remained the same: frantic urgency, hurry hurry hurry or you won't make it. Ross knew that there had to be a good reason for that driving urgency — something in the present situation must be fairly screaming at his subconscious that there wasn't much time left — but try as he would he could not bring that reason up to the surface levels of his mind.

Not all the dreams were unpleasant, however; those in which Alice figured were quite the reverse. In these the sky was always blue and the black ocean never obtruded itself. Here again the theme was always the same, with no very subtle variations, and such that he woke up hating his cold white room with its untidy piles of books and Beethoven scowling at him. After a dream like that he would gulp his breakfast and go storming up to the surface or to the first-level library and work even harder, and sometimes he would be able to forget it.

Now he was not allowed to work at all. Now he had no way of forgetting Alice, or the beach, or the small park — not very well tended — on the inland side of the hill, or the hospital as it had been. Except when he lost his temper and threw Sister's selected light reading back in the place where her face should have been. Sometimes that would start an argument, bad language and a furious silence on his part, at others an exchange in which he tried to make Sister feel as confused as possible while she tried to reassure him.

Sister was much smarter these days, and had absorbed several textbooks on psychology.

After one particularly hot session on the twelfth day of what Ross considered his imprisonment, he asked suddenly, "Do you know what is meant by telling a lie, or doing a kindness, or making a pun?"

Sister had been spouting Freud and sex urges at him as if she had used them all her life, and Ross had grown annoyed because the robot knew so much more psychology than he did that he couldn't even make a fight of it. This was his way of putting Sister in her place.

"I have no data on puns or their methods of construction," Sister replied briskly. "Doing a kindness means to render assistance, and telling a lie is, I have read, the transmission as true of data which is incomplete or false."

Ross said, "I take it, then, that you would do me a kindness but you would not tell me a lie."

"Of course, Mr. Ross."

"But suppose, in order to render assistance, you had to tell a lie," Ross went on. "For the sake of argument, let's suppose a man is devoting considerable time and effort to a project which you know will fail, you being in possession of more data on the subject. You also know that to inform him of this fact, which it is your duty to do, would cause him extreme mental distress, insanity and eventually death. Would you tell a lie then?"

"It is against our basic programming to give false or incomplete data," Sister replied. "I would require guidance by another human before making such a decision —"

"Stop ducking the question," said Ross sharply. "Our supposition calls for there being only one human, the one you have to he to." Then, in a quieter, more serious voice, he added, "I am trying to teach you the difference between giving assistance and being kind. If I can get the idea across to you, you may begin to think a little more like a human being."

"A human mind possesses free will, initiative," Sister protested. "No robot could —"

"Exercise initiative. But you did it when you awakened me without

a brace of Cleaners sitting on my chest And since then there have been improvements. The robots have given way to steamships." He laughed awkwardly and added, "That was a pun."

Sister said, "From my reading I know that steam-driven vessels were a later development than those propelled by oars, just as you have caused us to develop since your awakening. But I cannot understand why you used the word 'robots' when you should have said 'row-boats,' unless the accidental similarity of sounds…"

That particular discussion lasted for nearly three hours and broke off only because it was time for the lights to go out. To Sister the division between waking and sleeping periods was sharp. In the middle of a sentence she stopped speaking, paused, then finished, "It is time to go to sleep, Mr. Ross. Is there anything you want before I go into low alert?"

It was always the same formula and Ross had become tired of hearing it. Bitterly he said, "Yes, there is. I want a human female aged twenty, weighing one hundred and fifteen pounds, dark brown hair, brown eyes…" Under his breath he added, "… called Alice."

"Your request has been noted, but at the present time we are unable to —" began the robot.

"Good night, Sister," Ross said, and rolled onto his side.

He wanted to dream about Alice that night, but instead he dreamed that he was in a small, sealed room deep underground where the air was rapidly going stale. If he wanted to go on living it was imperative that he do something, quickly…

When Sister finally released him by speaking the magic word "sir" the First Expedition, as Ross liked to think of it, was ready to go. The same sense of frantic urgency which claimed his waking and sleeping moments alike tempted him to send it out quickly and with no change in the instructions he had already given. But although Sister had forbidden him to do everything else, she had not stopped him from thinking, or rather revising his thinking with regard to the purpose of the expedition. He had to consider the possibility that there might not be any other human beings left alive in the world he was proposing to search. If that should be the case Ross would have to take a long-term view.

A very long-term view…

The world he knew was either incinerated or almost aseptically clean. On the surface the war had been responsible for the former, and underground the conditions had been due to overzealous cleaning robots. With the exception of Ross himself, there was no organic life inside the hospital, not even on the microscopic level. There were no lab animals, living or dead. Like the corpses of the humans who had died, they had been cremated a few hours after death, and his own body wastes were similarly treated. The food containers, which still exploded in his face with irritating frequency, held a synthetic which never had been alive.

Ross had had the idea of finding some warm, tidal pool and filling it with all the scraps and leavings of organic life that he could find in the hope that sometime something in that hodgepodge of warring microorganisms would develop and grow until the evolutionary processes could take over again. He had been thinking in terms of millions of years, naturally, taking the long view.

But the tidal pools were choked with ash and soot, and even if his idea was possible a sudden storm or unusually high tide could wash his experiment back into the sea, where the material would become so diluted that no reaction could take place. And the idea was no good anyway because the robots had done a too thorough job of cleaning up.

That was why the First Expedition did not start out until two weeks later — it required that time to reprogram the Miner to search for and protect Life and not just human life. The books on plant ecology and horticulture were severely limited in the hospital, but his instructions included the necessity for absorbing any other data on this and related subjects which the expedition might uncover during their search, Small animals if any, insects, plants, weeds or fungus growths — all were to be reported, their positions marked and steps taken for their preservation until they could be moved to the hospital with absolute safety, for them. And finally Ross had given instructions regarding every contingency he could think of and he gave the order to move out.

On four sets of massive caterpillar treads the Miner %

rumbled through the thirty-foot gap which had been cut in the dome. Ross had been forced to compromise with his original idea for

an all-purpose, unspecialized machine, but as he watched his monstrous brainchild go churning past he thought that he had made a good compromise. The powered tread sections were simply a vehicle to transport the digger-nurse unit — which was the seat of the robot's not inconsiderable brain — and to house the information-gathering and retransmitting devices. It literally bristled with antennae, both fixed and rotating, spotlights, camera supports and deep-level metal-detection equipment which gave its outline an indistinct, sketched-in look. Sitting atop this transporter section with its conical drill reflecting red highlights, the digger-nurse unit pointed aggressively forward. In operation the digger would lift itself clear of the transporter, stick its blunt nose into the ground and go straight down. Like a hot marble sinking through butter, Ross had thought when he watched the first test run. Outwardly it was a monstrous, terrifying object, which was why Ross had ordered it and the four robots following it to be painted with a large red cross. He didn't want anyone to get the wrong idea about them.

Watching the cavalcade go past — Big Brother trailed by two repair robots and two Sisters modified for long-distance surface travel — Ross thought that a little stirring music would not have been amiss. He strained his eyes to keep them in sight as they rolled and lurched down the hillside, but it had been two days since the last rain and the ash was beginning to blow about again. Ross stopped himself from waving good-bye at them with a distinct effort; then he turned and began walking toward the small control dome.

Here had been installed the equipment which enabled him to see all that the search robots saw, and here it was that Ross spent every waking moment of the next five days. He watched the Miner's radar repeater screens, its forward TV and the less detailed but more penetrating infrared vision. Every half-hour or less he checked that it was still on course, which it always was, and many times he asked if it had found anything even though the repeaters told him that it hadn't. By turns he was bored and frantically impatient, and bad-tempered all the time.

Some of the things he said and did were petty. He knew it and was ashamed of himself, but that didn't stop him from saying them. But one of the incidents, on the other hand, gave him just cause for losing his temper. The matter of the exploding food containers.

"I am getting fed up with being plastered with this muck every, other mealtime!" he had raged, while trying to get rid of the foul-

smelling goo, which, because of some trace impurities present during its manufacture, had in two hundred years turned into a particularly noisome stink bomb. "Go through the stores and separate the unspoiled from the rotten, then bring me only the edible stuff from now on. You shouldn't have to be told such a simple thing!"

"Doing what you suggest would mean opening every single can, sir," Sister had replied quietly. "That would cause all the food to spoil within a short time. It is therefore impossible —"

"Is it, now?" Ross had interrupted, the acid in his voice so concentrated that he might have been trying to penetrate the robot's steel casing with it, "I suppose it is impossible to put the unspoiled food in cold storage until I need it, using the Deep Sleep equipment? It would have to be reheated, of course, but surely your gigantic intellect would prove equal to that problem! But there is an even easier way — just shake the things. If they give a bubbling, liquid sound they're bad, and if no sound at all then they are good.

"That rule doesn't hold good in every case, but I don't mind an occasional mess."

As always, Sister had filtered out the profanity, temper and sarcasm and proceeded to deal with the instructional content of the words. She informed him that his instructions had already been relayed to a group of Cleaners, who would report when the job was finished. Then she suggested that he look at the main repeater screen, where something appeared to be happening…

Four hundred miles to the northwest it had begun to rain, pushing the visibility out to nearly a mile. The Miner's forward TV brought him a swaying, jerking picture of a narrow valley whose floor was a mixture of muddy ash and large, flat stones which might have once been a highway. Ahead the valley widened to reveal a great, shallow, perfectly circular lake in which black wavelets merged with a rippled glass shoreline in such a way that it was difficult to make out the water's edge. And below the pictured scene a group of winking lights indicated the presence of metal, tremendous quantities of metal.

The find came as a complete surprise to Ross, because he had been directing the expedition toward a one-time city some eighty miles to the north. Obviously this had been a military installation which had been constructed after his time, there being no mention of it in the latest maps. The important thing, however, was the metal which had

been made available. Stumbling on it like that was such an incredible piece of good fortune that he couldn't help feeling, illogically perhaps, that more good fortune must follow it.

"Sink a tunnel to a depth of half a mile," Ross directed, trying not to stammer with excitement. "Angle in from a point two hundred yards beyond the water-line to avoid the risk of flooding…"

The digger unit unshipped itself, earth and ashes fountained briefly and it began its slow dive underground. Occasionally it altered direction to avoid large masses of metal, not because it could not go through them but merely in order to save time. It reported back continuously to the four-hundred-miles-distant Ross, by both speech and repeator instruments, and after nearly five hours' burrowing the picture of conditions underground was complete.

The installation had been a missile-launching base, extensive but not very deep. The bomb which had been responsible for the glass-bottomed lake, its force contained and to a great extent directed downward by the surrounding hills, had smashed its underground galleries flat. There were no survivors, but as the indications were that the base had been fully automated this did not bother Ross very much.

"I've been thinking," he said while the digger unit was returning to the surface. "Our construction program should be based on a site where metal is available rather than go through the time-wasting business of transporting it back here. So I'm going to send you as many repair robots as can be spared, and while they are on the way here is what I want done.

"You have absorbed data on open-cast mining," Ross went on briskly, "and your report states that there are large quantities of metal within fifty feet of the surface. I want you to rejoin your transporter unit as quickly as possible and have your repair robots modify it as a bulldozer. When you have uncovered —"

The Sister broke in at that point. "Mr. Ross," she said firmly, "it's time for bed."

Although Ross protested bitterly as he was led down to his room, underneath he was happier and more hopeful than at any other time since his awakening. He was still very far from achieving his goal of searching every square foot of the Earth's surface, but a beginning had been made. He knew the capabilities of his robots, knew that, given

the raw material — which was now available — he would have a duplicate Miner built by the end of the week, and the week after that he would have half a dozen of them. The square law, he thought, was wonderful. Compared to what he was going to do the achievements of the first few rabbits in Australia would be as nothing.

He went to sleep dreaming happily of the orders he would have to give next day, next week and next year…

As duplicates of the first Miner were completed Ross sent them to investigate the sites of bombed towns and cities in the area, but for Miner One itself he had a special job. The inexplicable feeling of the need for urgency was still with him, as if somewhere, someone who was alive would die if he did not do the right thing quickly. Nevertheless, he sent Number One northward on a mission which did not include a search for human survivors. Fitted with special equipment and accompanied by a Sister with plant-biology programming, it had been ordered to search the polar areas for plantlife or seeds preserved under the ice. Life could survive intense cold; nobody knew that better than Ross himself.

Then suddenly he discovered who the someone was, the someone who was alive and who would shortly die if he did not think of something quick. It was himself.

"Using the testing procedure you suggested," Sister reported one morning shortly after he awoke, "we have found that approximately two thirds of the remaining food on this level is edible. A random sampling of containers taken from stores on the four higher levels indicates total spoilage. We suspect chemical changes brought about by radiation filtering down from the surface, which did not reach its full effect down here. At the present rate of consumption you have food for eighteen days.

"The matter is urgent, sir," Sister ended, with fine if unconscious understatement. "Have you any instructions?"

"There must be some mistake..." began Ross numbly, then went out to have a look for himself. But there was no mistake. Because it had been close to his room, he had been supplied with food from the lowest level; he had been using that store for two years, and now it turned out that it was the only one which contained edible food. This was something he should have checked on earlier, and it was now obvious that his subconscious had been trying to remind him of it during sleep. Yet if he had known earlier, what could he have done? Maybe fate had been kind to give him only three weeks' notice on the date of his death.

And Sister kept following him everywhere, continually asking for instructions.

"Yes!" said Ross suddenly, as it occurred to him that there was one useful order that he could give. He had been thinking emotionally, playing a distraught, tragic figure and not using his brain at all. He went on, "Signal all Miners and assistant robots to give priority to the search for underground food stores. Except Miner One, it is too far away to get back in time to do any useful work before the deadline…"

Deadline, he thought. Ross had a new definition of the word now — the end of a lifeline.

"… And start opening all the cans which you think are spoiled," he ended sharply, "in case your random sampling has missed a few, or a few dozen. Get as many robots onto it as can be packed into the storeroom. Now I've work to do on the surface…"

For a long time Ross had used hard physical and mental labor as a means of not thinking about the past. Now he was using it so as not to think about the future. Psychologically, he thought mirthlessly, you are a horrible mess.

The work involved a project which Ross had shelved temporarily in order to concentrate on the search for survivors, a robot helicopter. Now the possession of such a machine might mean the difference between life and death for him — if the search robots found food and if it could not be brought to him fast enough by land to reach him in time. So he built models and read aeronautical texts and watched his prototype helicopter chew up the hillside with its rotors in vain attempts to throw itself into the air. Then one day it staggered off the ground and circled at an altitude of one hundred feet under a rough semblance of control. Watching from the small dome, Ross felt very little satisfaction, because it had taken him thirteen days to achieve this. He had five days left.

The helicopter was still clattering about the sky when one of his Miners reported in. Negatively, as usual.

The problem, according to the robot searcher, was that its metal-detection equipment was not sensitive enough to differentiate between food canisters and the structural wreckage with which they would be associated. The only solution involved sinking test tunnels at intervals

and examining the wreckage visually. This was a long, difficult process which held small probability of success, the robot warned, because, in addition to the time involved, none of the city underground shelters had been as deep as the hospital's fifth level, so that any food which might be found would almost certainly be inedible.

"Things are tough all over," said Ross, and cut the connection viciously. But there was another attention signal blinking at him. He keyed it into the main screen and saw a wavering gray blur which resolved itself into a blizzard immediately the caller identified itself. It was Miner One.

"Sir," it began tonelessly, "data gained after forty-seven test bores leads me to the following deductions. During the war very many nuclear missiles were intercepted and exploded in the polar regions, and several interception bases and stockpiles were situated under the ice. It must have been the most heavily bombed area on the planet. The background radiation is still above normal, though not dangerously so. Analysis of the underlying soil shows complete sterility."

Ross didn't know what he said to the Miner. All hope had drained out of him and suddenly he was horribly afraid. His world that he had been trying to make live again was dead, the land a crematorium and the ocean a black graveyard, and himself a wriggling blob which had lived a little past its time. And now his time was coming.

He had never considered himself to be the suicidal type, and in the two years since his awakening he had never seriously considered it. But now he wanted to break cleanly with life before he could become any more afraid, something quick like a drop down the elevator shaft or a one-way swim out to sea. At the same time he knew that Sister would not allow anything like that. He knew that he was doomed to a horrible, lingering death from slow starvation, probably with Sister asking for instructions and clicking because she could not supply the one thing he needed, and he felt himself begin to tremble.

"Have you any instructions, sir?" said Sister, over and over.

"No!"

The Sister's voice was not designed to express emotion, but somehow she managed to do so as she said, "Sir, can you discuss the

future?"

In her emotionless, mechanical fashion Sister was frightened, too, and suddenly Ross remembered one of his early discussions with her. If he died then the robots' reason for being would be gone — it was as simple as that. No wonder they were all asking for instructions, and no wonder Sister had let him work two hours past his bedtime a few nights ago. He didn't know what death involved exactly for a robot, but it was obvious that they were scared stiff. He could feel sorry for them, because he understood how they felt.

Softening his tone, Ross said, "My original instructions regarding the search for survivors will keep you busy for a long time, and those instructions stand. And there is another area of search which I haven't mentioned until now. Space. There was manned space travel for six decades before the war, with a base on the moon and perhaps on other bodies as well. All of them would have had to be maintained from Earth and could not have supported life indefinitely. But with Deep Sleep techniques…"

It's a strong possibility, Ross thought sadly. If only I could have been around when those robots reported back.

"… Anyway," he went on, "I am giving you direct orders to find human survivors. Don't stop looking until you do. You will therefore be serving me until you find your new master, so I think that solves your problem."

"Thank you, sir."

"The moon and Mars are the best bets," Ross said, half to himself. "I know nothing about astronautics, but the search will turn up books on the subject, or uncompleted missiles which you can study. And be careful about the air pressure, you can operate in a vacuum but humans can't. And when you do find them tell them that I… tell them…"

It should be a noble, inspiring message, one that would ring gloriously across the centuries. But everything he wanted to say had a whining, frightened note to it, a coward's soliloquy. He shook his head angrily, then repeated Dr. Pellew's last message to himself.

"Tell them it's their problem now, and good luck."

Abruptly Ross whirled and charged out of the dome and along the corridor leading toward the elevators. Striding along, he cursed, loudly and viciously and as horribly as he knew how. He cursed to keep from crying and for no other reason, because the thought of Pellew and the brilliant, selfless, utterly splendid men who had preceded him was the greatest tragedy his world had ever known. He thought of Hanson, Pellew, Courtland and the others, of the desperate, unsuccessful experiment with the mutations, and the unending struggle to cure the incurables who were in Deep Sleep— which had been successful. But mostly he thought of those grand old men watching and working alone while all around them the patients and their colleagues slept, taking turns at going into Deep Sleep and running their relay race against time. And all for nothing. It had served merely to extend the lifetime of the human race, or more accurately the last member of it, by two miserable years.

11

Without remembering how he got there, Ross found himself in his room. The bed hadn't been properly made for days and the place was a shambles of scattered books and papers. Since dismissing the Cleaners, making the bed and cleaning up had helped keep his mind occupied, but lately he had had plenty of things to occupy it with. He tipped a pile of books off his chair, and, in the act of sitting down, saw himself in the locker mirror. He dropped the chair and moved closer. It had occurred to him that he was looking at the Last Man and he felt a morbid curiosity.

He wasn't much to look at, Ross thought: a skinny body dressed in a ridiculous toga. The face was thin and sensitive, with further proof of that sensitivity — or weakness — apparent in the way the lips quivered and in the dampness around the eyes. It was a young, impressionable, enthusiastic face, the face of a man who was too much of a coward to face reality and too stupid to give up hope. Ross turned away and threw himself onto his unmade bed.

For two years he had tried to avoid thinking of the past because of the awful sense of loneliness and loss it brought, and he had concentrated instead on a bright, distant, rather indistinct future in which he would gradually bring together a nucleus of humanity and set out bravely to repopulate the world. Now he had to face the fact that he was going to die soon, that there was no future, and that the only thing of value left to him was the past. He wanted to remember his preawakening period, now — in some strange way he considered it his duty to remember as many places and events and people as he possibly could.

Gradually his fear had been replaced by a mood of vast solemnity, a sadness so complete and all-embracing that it was almost a pleasure. Now he knew what he had to do with his remaining days of life.

Remember.

For the days which followed Ross set a timetable for himself — a loose, unhurried timetable which was subject to change without notice. In the mornings he read, chiefly from books which he had

hitherto considered painful or a waste of time. He did not complete the works but dipped briefly into poetry, into brute violence, into sickly-sweet romance. Sometimes he would merely look at the dust jackets, at the ordinary, studious or pseudo-Bohemian faces who had had three children, or gained a Nobel Prize or been married three times, and who had produced works like The Body Doesn't Bleed, Alternative Method for Producing the Hannigar Meson Reaction or Dawn Song. He did not try to criticize or evaluate; the good, bad, tragic, sordid and glorious were remembered, and nothing more. In a way Ross was holding a wake, remembering the good and bad points of the deceased, and he had an awful lot of remembering to do.

In the afternoons he would pace the long, shining corridors and go over in his mind what he had read that morning, or he would listen to music or lecture tapes — the few remaining which had not become distorted beyond use by the passage of time — or try to hum a piece of music which originally had been scored for full orchestra. Then in the evening he would return to his room and get into philosophical arguments with Sister until the lights went out.

It was then that his hands would begin to shake and he would begin to wonder if he would be able to carry on with this act of quiet resignation to the end, or, when his hunger became extreme and he no longer had the strength to read or hold a book, would he start crying and begging for the robots to do something, and die blubbering like a baby? He was only twenty-four and he didn't think he could trust himself.

On the fourth day — the last in which he would have full rations — he Went onto the surface. It had rained during the night and visibility was fairly good. He found a rock on the hillside facing the sea and sat watching the grimy rollers breaking on a black shore. It was his own life he was remembering now, some ingrained habit of politeness returning people and incidents in their reverse order of importance. His sheltered childhood, the emotional confusion of adolescence, the hospital with its acid-voiced ogre Dr. Pellew, the parents he was beginning to appreciate only now, and Alice…

Suddenly restless, Ross got up from his rock and began climbing the hill again. He walked quickly past the control dome, to which the search robots continued to send in their negative reports — no food, no survivors, no life of any kind. When he came to the landward-facing slope, which had once been the hospital park, he stopped.

An expanse of rich, dark earth streaked with ash in which nothing grew, not because it was incapable of supporting growth but because all growing things were dead. On the day before he was to go into Deep Sleep it had not been like this, however; Ross felt that he could remember every unpruned bush and knee-high blade of grass. The park never had been well tended.

He had been trying to act as though nothing very important was going to happen, as if Deep Sleep was a simple appendectomy. When Alice came off duty he had asked her to go swimming with him, the way he had always done. Ross wanted to have a last swim and to say good-bye to her on the beach. But Alice had insisted that the sea wind was too cold — it was late September — and she wanted to go for a walk instead. She had held his hand tightly even before they left the hospital building, and Alice had previously been too shy for such public demonstrations of affection, and they had gone into the park. He had tried to keep the conversation gay and inconsequential for as long as he could, but eventually he had to begin to say goodbye…

While the idea of Deep Sleep had frightened Ross, it had been nowhere near as strong as a fear of death. He knew that he would awaken someday and so far as he was concerned there would be no interval of time. But he had not realized that to Alice he was going to die tomorrow, going to disappear from the world and from her life. He had not been prepared for this Alice, who clung so fiercely to him that he could hardly breathe, and wet his cheeks with her tears and whose eyes, when they looked into his, held so much love and sheer compassion that…

She had been a quiet, thoughtful girl — pleasant, but practical. They were to be married when Ross qualified, but even with him she had maintained a certain reserve. He remembered her telling him laughingly that she preferred to neck on the beach, because there the ocean was handy for him to cool off in.

Standing on that muddy hillside with its eternal smell of damp smoke, Ross knew that Alice was his most precious memory. He thought that at this moment, with the memory of that slow walk back through warm-smelling grass which caught at their feet sharp and clear in his mind, he was prepared to die.

And then suddenly his newly achieved mood of calm and solemn acceptance of his fate was shattered, by that same memory. He began to tremble violently as the realization grew in him that he might, just possibly, not have to die at all. On that September day he had been given more than he knew: He had been given his life. Oh, Alice… he thought.

Behind him Sister was expressing concern over his shivering and making determined efforts to take his temperature. This struck him as being excruciatingly funny and he began to laugh. Sister became even more concerned. "I'm all right," he said, sobering. In a voice which was still far from steady he gave his orders. All search robots were to be recalled for a special project. He gave minutely detailed instructions regarding it to Sister, and made her repeat them back, because he would not be available himself when they arrived. Finally, immediate preparations must be made to put him into Deep Sleep…

Four hours later he was lying in the padded, coffinlike container with the section above his face hinged back to reveal the glittering lenses of Sister staring down at him. The cold had passed the uncomfortable stage and was becoming almost pleasant.

"Now remember," he said for about the fourth time, "if the idea doesn't work out I don't want to be awakened. You'd be wakening me only to let me die of starvation…"

"I understand, sir," said Sister. "Have you any other instructions?"

"Yes…" began Ross, but lost track of what he said after that. The chill was accelerating through his body and he must have been in a kind of cold delirium. Soon the entire room and its contents would be similarly refrigerated as a precaution against a breakdown of his container, a point which he had forgotten until a few hours ago. He kept seeing the ludicrous picture of three Path Sisters dissecting the cuffs of his old tweed trousers. Swim or walk, sea or park, death or life. He wanted Alice. "I'm sorry, sir."

The flap closed with a gentle click and the cold was like an explosion within him that engulfed his mind in icy darkness. But deep

inside him there was a spot of warmth which had no business being there, and a light which grew until it pained his eyes. Faulty equipment, he thought disgustedly, or they've muffed it. When his vision cleared he glared up at Sister, too angry and disappointed to speak.

"Do not try to move, Mr. Ross," the Sister said sharply. "You are to undergo a half-hour massage, after which you should be able to walk unassisted. Are you ready…?"

It might be massage to Sister, Ross thought as he gritted his teeth in agony, but to him it felt like the treatment received in the worst of the old-time concentration camps rather than something of therapeutic value. At the end of the longest half-hour of his life Sister lifted him to a sitting position, and he succeeded in gathering enough breath to speak.

"What happened? Why did you wake me up…?"

"Can you stand up, Mr. Ross, and move around?" asked Sister, ignoring him. Ross could, and did. The robot said, "I suggest we go to the surface, sir."

Noting the "sir," Ross snarled. "So I'm not your patient anymore, somebody you could order about and beat half to death? Now I'm the boss again, and I want some straight answers. What went wrong, why did you halt the cool-down? Have you found an edible food cache…?"

"You have been in Deep Sleep," said Sister quietly, "for forty-three thousand years."

The reply left Ross mentally stunned. He was unable to speak, much less ask further questions during the trip to the surface, and there he received a greater shock.

The sun shone clear and yellow and incandescent out of a pale blue sky, and from his feet a rippling sea of green stretched to the horizon. Five miles away the hills which he had not been able to see since his first Deep Sleep had a misty look, but it was the pale shimmer of a heat haze rather than windblown smoke. The air tasted like nothing he had remembered, so clean and fresh and sparkling that he seemed to be drinking rather than breathing it. Ross closed his eyes and with heart pounding madly in his throat turned a half circle; then he opened them.

Pale blue sky and deep blue sea were separated at the horizon by a distant range of white cumulus. The bay was filled with whitecaps and the biggest rollers that Ross had ever seen burst like liquid snow onto a beach that was clean yellow sand for as far as the eye could see.

Suddenly visibility was reduced to nil by a mist in his eyes, although Ross never felt less like crying in all his life.

"It took much longer than you had estimated," the Sister's voice came from behind him, "for the grass grown from your seedlings to make the change from interior cultivation in artificial UV to surface beds covered by transparent plastic, and even longer before they would grow unprotected on the surface. This was due to finely divided ash in the atmosphere having a masking effect on those sections of the solar spectrum necessary for the growth of plant life. However, time and natural mutational changes had produced a strain capable of surviving surface conditions."

Without pausing. Sister went on, "While this strain was developing the ash was gradually being absorbed by the sea and land surface, causing an increase in sunlight. This accelerated the spread of the grass, which in turn hastened the fixing of ash into the soil. And as the grass had no natural enemies or competing life forms, its spread across the planet was, relatively, quite rapid. But it required an additional several millennia for it to evolve, and for us to isolate, edible grains suitable for processing into food.

"This has now been done," Sister concluded, "and your food-supply problem is solved."

"Thank you," Ross mumbled. He couldn't take his eyes off the bright yellow sand on the beach. Wind, rain and salt water — mostly

the salt water, he thought — had brought about chemical changes which had given the once-grimy beach this freshly laundered look. All it had needed was a little time.

Forty-three thousand years...!

Even the ghosts of the past were dead now, and the proud works of Man, with the exception of this one, robot-tended hospital, were so many smears of rust in the clay. Ross shivered suddenly.

Sister began speaking again, interrupting what was becoming a very unpleasant train of thought.

She said, "Your present physical condition is such that, although you cannot be classified as a patient, an immediate return to full-time duties is to be avoided. I suggest, therefore, that you do not concern yourself with our various progress reports just yet, and instead that you take a vacation..."

There was a clap of thunder that went on and on. Ross looked around wildly, then up. He saw a tiny silver arrowhead at an unguessable altitude drawing a dazzling white line across the sky. As he watched the vapor trail developed a curve and the ship went into a turn which would have converted any flesh-and-blood pilot into strawberry jam. It lost speed and altitude rapidly and within minutes was sliding low over the valley and heading out to sea again. The noise made it hard for Ross to think, but it seemed that the ship had slowed to far below its stalling speed. Then a shimmering heat distortion along its underside gave him the explanation: vertically mounted jet engines. It came to a halt above the beach and began to sink groundward. For a moment it was lost in a sandstorm of its own making; then the thunder died and it lay silent and shining — all two hundred feet of it!

He hadn't mentioned vertical-takeoff models to the robots, Ross told himself excitedly; this was something they must have worked out for themselves, probably with the help of books...

"Now that it is possible, we thought you might like to travel during your convalescence," Sister resumed, "and the robot which you see on the beach contains accommodation for a human being. If you feel up to it I would suggest —"

Ross laughed. "Let's go!" he shouted, giving Sister a slap on her

smooth, unfeeling hide. He stumbled twice on the way down, but it was sheerest pleasure to fall onto that long, sweet-smelling grass, and the too-hot sand which burned his bare feet was like a sharp ecstasy. Then he was climbing into the cool interior of the ship and looking over the accommodation.

The observation compartment was small, contained a well-padded chair and gave an unobstructed view ahead and below. There was a larger compartment opening off it, containing a bunk, toilet facilities and a well-stuffed bookcase. Ross would not have minded betting that the books were all light, noncerebral works.

"You've thought of everything," he said, spontaneously.

"Thank you, sir," said the aircraft, speaking through a grille behind the observation chair. In a pleasant, masculine voice it went on, "I am Searcher A17/3, one of five models designed for long-range reconnaissance and search-coordination duties. On this assignment, however, the maneuvers and accelerations used should cause you the minimum of physical discomfort. Where would you like to go, sir?"

Later, Ross was to remember that day as being the happiest of his life...

At altitudes of ten miles down to a few hundred feet, and at speeds ranging from zero to Mach Eight, Ross looked at his world — his fresh, green world. He did not think that he was being conceited for regarding it as his own, because he had found it a blackened corpse and he had brought life to it again. For the grass, which had originated from a few tiny seedlings caught in the cuffs of his trousers, covered all the land. Ross was happy, excited, stunned by the sheer wonder of it.

In equatorial Africa and around the Amazon Basin the grass was a tangle of lank, vivid green. The old-time grasslands were emerald oceans which stretched, unrelieved by a single tree or bush, to the horizon. Sparse and wiry, the grass struggled to within twenty miles of the Arctic ice, and on the highest mountains it stopped just short of the snowline. There were seasonal changes of color, of course, and variations due to increasing altitude and latitude, but they were too

gradual to be easily apparent. To Ross it looked as though someone had gone over the whole land surface with a paintbrush, coating everything with the same, even shade of green. Sometimes an inland lake, or a desert, or a snowcapped range of mountains would suddenly break the monotony of land- or seascape, and Ross would tell himself smugly that although his world might run heavily to unrelieved blue and green, that was a much nicer color scheme than gray and black.

Late afternoon found him flying above the Caribbean. When he saw the island. It was one of many, a small, flat mound of green ringed by a white halo of surf, and Ross did not know why he picked it in particular. Perhaps it was the tiny bay. which gleamed like a yellow horseshoe on its western shore which caused him to order the aircraft to land. Certainly he had been feeling like a swim for the past few hours.

Sister raised no objections beyond reminding him that he was not to overexert himself, that in the time since his last exposure to sunlight the mechanics of stellar evolution had brought about a significant increase in solar radiation, and that in all the world there remained not one usable tube of sunburn lotion. Nodding soberly, Ross told her that he would bear all these points in mind. Then he wheeled and went charging down the beach and, with a wild yell, dived into a monster wave which was just beginning to curl at the top.

After the swim he moved inland to where the sand gave way to long, hot grass, and lay down to dry off. The sun was very hot, despite its being only an hour before sunset. A great, drowsy happiness filled Ross, and a quiet optimism for the future of his world, his robots and his race. He was too sleepy and contented at the moment to work out details, but, considering what he had already accomplished, he felt very confident. Sighing, he rolled onto his back, and his fingers unconsciously went through the motions of pulling a long stem of grass and placing it between his teeth. He began to chew.

At that point Sister informed him that the grass he was chewing was not one of the edible strains, but that its use in small quantities would not prove harmful. Ross laughed, then climbed to his feet and headed toward the aircraft. There he made a sizable dent in its food store and a somewhat larger one in its bunk. And so ended the happiest day of his life.

Ross awoke next morning to find the ship airborne and climbing to avoid a hurricane which was sweeping in from the southwest. An hour later, two hundred miles west of Panama, he spotted the vapor trail of another A17 and spoke with it briefly without diverting it from its search duties. He had barely finished speaking when he saw a long, whitish smudge on the surface of the sea close to the horizon. Within minutes it had resolved itself into the most awe-inspiring sight that Ross had ever seen.

Next to his grass, that is.

Spaced out in perfect line abreast at intervals of half a mile, close on one hundred long, low, angular ships battered their way through the long Pacific swell like some gigantic battle fleet. Five hundred feet long, excessively low in the water, their superstructures covered with a random outgrowth of bumps, girders and angular projections, they were like no ships that history had ever seen. Devoid of such purely human necessities as decks, ports and lifeboats, their bizarre aspect was perhaps explained by the fact that they were ships which sailed rather than ships which were being sailed. Their wakes boiled and spread dazzlingly astern as if each ship were towing a thin white fan, until the sea turned almost to milk before the turbulence died. One hundred ships, identical but for the numerals painted on their bows, all holding a formation which would have sent the most exacting admiral in history into paroxysms of joy.

"The Pacific search fleet," Sister explained. "They are equipped with every method of underwater detection mentioned in the literature available to us, together with some which seemed to us to be a logical development of that data. They are accompanied, at a depth of five hundred feet, by ten auxiliary vessels capable of making a close investigation of any find down to a depth of one mile. Below that their pressure hulls implode and special equipment is necessary."

"Let's go down for a closer look," said Ross.

For half an hour he flew up and down that tremendous line of ships, communicating with some, but often just staring spellbound at the breathtaking perspective and at the way they seemed to even pitch and roll with the waves in unison. He, Ross, had been responsible for bringing this vast fleet into existence, and the thought made him feel a little drunk. He had a sudden urge to make them re-form into triple

lines ahead, or concentric circles, or to make them spell out his name across fifty miles of ocean, but conquered it. Then shortly afterward Sister suggested that they fly southwest; she wanted to show him the interplanetary search project...

That also was a happy, exciting day, but his pleasure was being spoiled by a constant and growing restlessness. He wanted to get back to work and Sister wouldn't let him. If he tried to give instructions to some of the search robots Sister countermanded them, and if he asked for detailed reports on anything she stopped that, also, with the brisk reminder that he was on vacation. Hitherto the robot had treated him in one of two ways — as a patient, when she didn't do anything he told her, or as the Boss who was obeyed implicitly. Now she had seemingly developed a third alternative in which she did some of the things he asked and argued him out of the rest. At first he had suspected a malfunctioning which might have been due to the absence of Sister's data-storage trailer — he had thought that she had left it behind because of its awkwardness inside the aircraft. But then Sister informed him that she had not had to use the thing for the past ten thousand years, that sub-miniaturization and new data-indexing techniques had rendered it obsolete.

And so for two weeks Ross lazed and swam and collected a suntan on all the famous beaches of the world, until Sister indicated that he was fit to resume work by saying, "The search reports are kept at the hospital, sir. Do you wish to return?"

Again happily, Ross went back to work. Except for short breaks when he swam or went for a walk across the valley, all his time was spent in an enlarged control room which he had ordered built overlooking the sea. Between watching pictures relayed from search subs on the ocean beds or gray, static-riddled views of the lunar Alps, he worked at bringing himself up to date.

The land surfaces of the planet had been searched, thoroughly, to within a few hundred miles of the poles. One thousand, seven hundred and fifty-eight underground installations had been discovered and examined, which included launching bases, hospitals, underground towns and single residences, and mines converted into bomb shelters. In the sea seventy-two military or naval establishments had been examined up to the present, but two thirds of the Pacific and much of the Indian and South Atlantic Oceans had yet to be searched. So far three bases had been discovered on the moon, but none of them had been able to survive the warheads sent against them.

The search had uncovered vast quantities of usable metal, all of which had been salvaged, and many functioning robots and other servomechanisms of the nonthinking type. Millions of books of all kinds, engineering blueprints and various pictorial forms of data had been scanned, absorbed and stored in special memory banks, where they could be reproduced at will. As a result of this his robots had become much more adaptable, and gained tremendously in initiative. Now his most general and loosely worded instructions, even wishes he had left uncompleted, would be acted upon correctly and as quickly as was possible.

Altogether a tremendous achievement. But on the negative side…

No human survivors had been found, no animal life of any kind. Birds that flew, insects that crawled, worms that burrowed: none. The sea, lifeless.

Looking out of his dome, Ross began to hate the grass which rolled away on three sides of him. Apart from himself, it was the only thing which was originally alive oh the whole planet, and the only thing which he had gained by his last sleep was a well-stocked larder.

He took to wandering about the valley and throwing himself down on the grass at a different spot each day. He would lie for hours at a time, staring at the sky and praying just one spider or earwig or ladybird would crawl across his arm or leg. He began speaking to the robots less and less, which distressed Sister considerably. She began looking for ways and means of interesting him, and one day she actually succeeded.

"One of the robots we salvaged is a Tailor, sir," she said brightly as

Ross was about to set out on another aimless walk. "It had occurred to me that you might like something more functional than the bed linen to wear."

Three hours later Ross found himself climbing into his first proper clothes in more than forty thousand years. As he stood before the mirror, resplendent in the tropical whites of a naval captain, Ross thought that it was just his luck that the robot had been a military Tailor. But the whites did set off his tan to advantage. If Alice could have seen him now…

"You've made this from bedsheets, too," said Ross harshly, to break a painful train of thought. "Try dyeing the stuff. And if you make it with an open collar, don't forget the shirt and tie to go with it, otherwise it would look ridiculous."

"Yes, sir," said the Tailor and Sister in unison. The Tailor moved off and Sister asked, "Is there anything else, sir?"

Ross was silent for a moment; then he said, "I'm fed up, bored, I'd like to go to the moon."

"I'm sorry, sir," Sister replied, and explained that the accelerations used would be instantly fatal to a human being, that radiation from the vessel's power unit would kill him within a few hours, and that there were other hazards, both radiation and meteoric, which they had no means of guarding him against. For the last human being, space travel was too risky.

"In that case," said Ross carefully, "I think I should go into Deep Sleep again."

"For how long, sir? And what reason?"

Forever, Ross felt like saying, but he knew that if he did Sister would start treating him like a patient again. He had a good reason — or excuse, rather — for wanting to undergo suspended animation again. The idea had come during one of his many despairing hours lying in the grass, and the funny thing was that it just might work despite being only an excuse.

He said: "There is no longer any hope of finding human survivors, in space, under the sea, in or out of Deep Sleep, and it is foolish to pretend that there is. My only purpose must be to bring intelligent

organic life back to this planet, and for that we must seed the oceans. Life began in the seas and it may do so again. However, the only organic material available in quantity is the grass, so here is what I want done.

"First choose a strain which flourishes in swampland," he continued quickly, "and gradually increase the depth of water until it grows completely submerged, then gradually replace the fresh water with an increasingly saline solution. Replace soil with sand, and ultimately transplant into shallow sea water. I know that I'm trying to make evolution run backward, but there is a chance that a strain of sea grass might adapt into a mobile life form, and eventually develop intelligence.

"Do you understand your instructions?"

"Yes, sir," said Sister, and added, "The search of the Pacific will be completed in seventy-three years. Would you like to be awakened…?"

"You are not to awaken me until the project is a success," said Ross firmly.

And if it wasn't a success, they would never wake him up. At the moment Ross did not care. All at once he was overcome by a horrible depression and a feeling of loneliness so intense that it was like a twisting cramp inside him. He knew that there had been no need for him to rush into Deep Sleep again so quickly, that it might appear to Sister that he was doing it in a fit of pique because she wouldn't allow him a trip into space. The truth was, he admitted to himself, he wanted to escape.

His hopes of finding survivors had been sheer self-delusion, of the same order of probability as discovering a genii who would make his every wish come true. Even worse had been his hope of bringing intelligent life back to his world, of sleeping across the millennia and awakening only for fleeting moments to guide it up the evolutionary ladder until they would stand beside him as equals. That had been hoping on a colossal scale, and he had only now begun to realize that the scale had been more than colossally stupid.

One thing became very clear to him as the robots prepared him for the third time, and that was that he wanted to die in his sleep…

An hour or so later, to him, the robot masseurs were finishing their pummeling of his warming body, and Ross asked the inevitable question. Sister told him twenty-two thousand years.

"Hardly a catnap," said Ross sourly.

He felt cheated. His mood of depression, the horrible, aching loneliness, and the awful boredom were with him as strongly as ever. Like his body, they had been preserved intact across the millennia. Perhaps something had happened to make him feel better.

"Make your report," he said tiredly. "Or, better yet, let me have a look. And don't tell me that I'm unfit to receive reports or that I should take a trip. My last vacation, by subjective time, was ten days ago, so just take me to the surf ace..."

The grass had grown taller and become less flexible — it would no longer be pleasant to lie down in it, Ross thought. His heart was pounding and he felt lightheaded, clear indications that the oxygen content of the air had increased. The breakers still crashed in a satisfying manner onto the beach, but the beach was green!

There was no sand at all, just a wet tangle of grass which ran unbroken along the shore and straight into the sea. The waves had a strong greenish tint, proving that it extended a considerable distance underwater.

"I couldn't swim in that stuff!" Ross burst out. It didn't matter that Sister was describing the development of a strain which would flourish in sea water, and which repeated uprooting by heavy seas had caused to evolve a limited degree of mobility. The process by which uprooted and washed-up sea grass moved back into the sea was a slow one, and only rarely successful, but it could be the beginning of an intelligent plant life-form, Sister affirmed. But Ross could not work up any enthusiasm over the achievement; he kept thinking that the only pleasure left to him had been taken away.

"And you woke me up for this?" said Ross disgustedly. "For a lousy plant which takes three weeks to crawl five yards back to the sea. Cool me again, until something worthwhile happens. Right now."

The next time he awoke and went up to the surface it was night. The grass stood ten feet high, each stem a half inch thick, and the wind scarcely moved it. On the beach sand again shone whitely, lit by a moon swollen to three times its normal size. Sister explained that increasingly high tides caused by the moon's drawing closer to its primary had forced the sea grass downward onto the ocean bed to escape the constant uprooting and several interesting, if minor, mutations had occurred. The sun was now too hot for him to bathe in safety.

Listlessly, Ross received the reports that the search of the Pacific, Luna and Mars had produced negative results. He barely looked at the picture relayed from the sea bottom showing the latest changes in his grass — to him the mutations seemed very minor, and not interesting at all. And before the bloated, yellow moon had gone down into the sea he asked Sister to return him to Deep Sleep.

"I advise against it, sir," said Sister.

"But why?" Ross demanded. "There is nothing for me here, and besides, you should be grateful that I want to spend so much time in Deep Sleep. Didn't you tell me once that I am the last human being, and that when I die your reason for existence will be gone? You should be glad of the chance to spin my death out for a few hundred thousand years. Or don't you need me anymore?"

Sister was quiet for so long that Ross thought her audio circuits had developed a fault. Finally, she said, "We are still your servants, sir, and always will be. We are also grateful that your lifetime has been extended by Deep Sleep, but feel that allowing you to do so indefinitely shows selfishness on our part. In addition to the sound psychological reasons for your remaining awake, we feel that you are entitled to some pleasure, too."

Ross stared at the gleaming ovoid body with its one fixed and one rotating lens and wondered incredulously what had become of the robot which had clicked irritatingly at him and droned, "I am not programmed to volunteer information." This robot had developed intelligence to the point. where she was being troubled by something remarkably like a conscience! She had become so human a personality that Ross had forgotten when he had stopped thinking of her as "it."

Suddenly he felt ashamed.

It was high time he came to grips with reality. Sister was right, even though the pleasures available were severely limited.

He said: "I suppose there is nothing against me having a midnight swim, providing I'm careful not to stab myself to death with the grass on the way to the beach."

"The water is pleasantly warm, sir," said the robot.

"I could study, start helping you with your problems again. And I could travel."

"By land, sea, or air, sir."

"Good," said Ross, and stopped. He was beginning to get an idea, a pretty wild and at the same time a very childish idea. As it grew he had to tell himself several times that he was the Boss, that the world and everything in it was his, to do with as he liked. He grinned suddenly, thinking of the vast army of robots at his command — something like two million, according to Sister's latest figures. A large proportion of them were immobile, or would be unable to participate for various reasons, but even so he thought that it promised to be quite an affair. Excitedly he began detailing his requirements.

Sister listened, made no objections, and informed him that what he proposed would require approximately three weeks. Ross replied that he would spend the time swimming, studying and consulting with the Tailor. Then he returned to his room to sleep, as happy boy with a new set of toy soldiers.

But when the great day dawned Ross had plunged from excited anticipation to a new low in despair. During the past three weeks he had tried study, tried to produce some original thoughts on his present situation and future hopes, only to find that all books had deteriorated into uselessness, their contents recorded in the brains of robots. The robots were in possession of full and accurate data on all subjects from astronomy to zoology, and the ability to make use of it in such a way that it made Ross's slow, human methods of reasoning seem moronic by comparison. Time and again he had started arguments with them on such obtuse subjects as genetics, the continuous-creation theory and moral philosophy, only to be confounded every time. It was no comfort for him to discover that he was arguing not with one robot

but hundreds, all storing their share of data and making it instantly available to one another.

The mechanics of that communications and indexing system had interested him, until one of the robots tried to explain it and he understood about one word in ten.

His robots were far smarter than he was. Ross felt stupid and useless, like an idiot child. And he did not care now whether he played with his toys or not. But they had been gathering for days, overlaying the green of the surrounding hills and valleys with the shining gray of their bodies, sliding like long metal ghosts into the bay to drop anchor, and scoring thunderous white lines across the sky before landing on the plateau to the north, and he felt that he had certain obligations toward them. So he dressed himself in the navy-blue uniform, which was styled after that of an army major general and bore the wings and insignia of an air marshal, and swung over his shoulders an ankle-length cape which was lined in red and trimmed with gold. Then he went up to his control dome and gave the signal for the review to commence.

Immediately the land robots lurched into motion, forming themselves into a column that was easily a quarter of a mile wide and which rolled toward him along the valley floor and passed within a hundred feet of the dome before disappearing around the shoulder of the hill. They poured by like an endless metal river, types which he recognized as descendants of the original Miners, but many others which he bad to ask Sister about. The long, tree-hard grass was flattened and churned into the earth by the passage of the first wave, and before an hour had passed the column had gouged a quarter-mile furrow along the valley which was in places twenty feet deep. Ross turned to look out over the bay.

Obviously his ships had bad access to considerable data on naval maneuvers. In rigid, closely spaced flotillas down to single units they charged back and forth across the bay, weaving to avoid other ships engaged in equally complex operations, and throwing up a dramatic white bow-wave which fluttered like a battle ensign. Ross was stirred in spite of himself. The bay was a blue slate thirty miles across, literally covered with the white scrawls and squiggles left by the hurrying ships. His eyes were caught by a robot that was almost the size of an old-time battleship which had dropped two search subs and launched an aircraft while tearing shoreward at full speed. At the last possible moment it went slicing into a U-turn which threw a dazzling

scimitar of foam astern and went charging out to sea again. Then a multiple sonic crash pulled his attention skyward.

In perfect echelon formation five descendants of the A17 Searchers roared low over the valley and pulled into a vertical climb that made the two-hundred-foot arrowheads shrink to dots within seconds; then they curved over into a loop and came screaming down again. They leveled out over the sea, re-formed and went thundering past the control dome in a rigid line abreast.

Ross saluted.

Immediately he felt his face burning with shame and anger. He had been thinking and acting in the most childish way imaginable: playing-acting, dressing up in theatrical uniforms and treating the robots as if they were his toys. And the toys had cooperated to the extent that they had made him salute them! Were the damn things trying to get a rise out of him or something…?

"Do it again," snarled Ross. "And this time close up, there's about half a mile between you!"

"Not quite as much as that," Sister objected. "But at the velocities involved it is safer to —"

"I have seen human jet pilots," said Ross scathingly, "who flew wingtip to wingtip…"

Effortlessly the formation climbed, though not quite wingtip to wingtip, rolled into their loop and leveled out, and suddenly there were only three of them and a formless tangle of wreckage which fell across the sky to crash three miles inland.

"Wh-what happened?" said Ross foolishly.

Sister was silent for nearly a minute, and Ross thought he knew what was going on in her complex, mechanical mind. Then she told him simply that two robots of the higher intelligence levels had been irreparably damaged, that their metal was salvageable but the personalities concerned had been permanently deactivated. She also suggested that he go below at once, as the robots had possessed nuclear power plants and there was a danger of radioactive contamination.

"I'm sorry," said Ross, "truly I am."

On the way down to his room he had time to think about a lot of things, but chiefly of the complete hopelessness of his position and his pathological refusal to accept the reality which had faced him on his first awakening. He was the last man and he should have accepted that fact and allowed himself to die of starvation when he had the chance. Instead he had instituted a search for survivors which was doomed from the start; then he had tried to re-create intelligent life and produced only grass. The race of Man was finished, written off, and he was simply a last loose end dangling across Time.

Maybe he wallowed a little in self-pity, but not much or for very long. He did some positive thinking as well.

Over the years the robots had developed intelligence and initiative to an extent which would have been frightening if Ross had not known that they were his servants and protectors. Their basic drives, he now knew, were the need to serve Man, the urge to acquire data and experience in order to serve Man more efficiently and the purely selfish urge to improve their own mental and physical equipment. If, however, they could be made to serve themselves rather than Man, what then? The answer was a race of intelligent beings who would be immensely long-lived and virtually indestructible, in short a super-race who would take over where Man had left off.

There was nothing that the robots couldn't do, if they would only stop thinking like slaves.

When they reached his room Ross sat on the edge of the bed and began repeating his thoughts to Sister, and the conclusions he had come to regarding them. He used very simple words, as though he was talking to the old, childish Sister of his first awakening, because he wanted to make absolutely sure that the robot — that all the robots — understood him. As he spoke a feeling of ineffable sadness overcame him, and, strangely, a fierce pride. This was a moment of tragedy and greatness, of Ending and Rebirth, and Ross was suddenly afraid that he was going to ham it up.

Awkwardly, he concluded, "... And so you can regard me as a friend, if you like, or a partner." He smiled bleakly. "A sleeping partner. But that is all. From now on I have no right to command you. I have set you free."

For several seconds the robot did not say anything, and Ross never did know whether his noble act of self-sacrifice was refused, ignored as the ravings of a sick mind, or what. Then Sister spoke.

"We have prepared a little present for you, sir," she said, "but, bearing in mind your remarks some time ago on the subject of kindness as opposed to assistance, I have been undecided as to whether or not I should give it to you. I hope you like it, sir."

It was a large picture, life-size and in color, of the head and shoulders of Alice. Obviously an enlargement of the photograph he had kept in his wallet. The flesh tints were off slightly, her glorious dark tan had a faintly greenish sheen, but otherwise the picture looked so natural and alive that he wanted to cry or curse.

"It's perfect," he said. Thank you."

"You always call for her during your last moments of consciousness prior to Deep Sleep," Sister went on, "and even though the wish is expressed while your mind is incapable of working logically, we must do everything possible to try to fulfill it. At the moment, this, was the best we could do."

Ross stood the picture against the bust of Beethoven and looked at it for a long time. Finally, he turned to Sister and said, "I want to go to sleep."

They both knew that he wasn't talking about bed.

While he slept his world of grass absorbed carbon and C02 from the soil and air, synthesizing oxygen. Over the centuries the oxygen content of the atmosphere increased, doubled. "It was inevitable that a long dry spell would occur, broken by a sudden thunderstorm. A flash of lightning stabbed earthward, igniting the grass, which now grew in spines twenty feet high. Within minutes there raged a conflagration covering several acres, which hurled towering fountains of sparks into the sky and spread with the speed of the wind. For in that oxygen-rich air even the damp material caught and the sparks never went out. A tidal wave of fire swept across the continental land masses, slowed but never stopped by rainstorms, adverse winds or mountain ranges. A few islands in mid-Pacific escaped, but all the others caught the airborne contagion and became their own funeral pyre.

Ross awoke to a scene which made him think that Time had gone full circle: sooty ground, smoke and a baleful, red-ringed sun. Before he could say anything Sister explained what had happened, then went on to assure him that the amount of carbon released into the atmosphere had restored the oxygen content to normal and that the combustion products currently fouling the air would, as they had done once before, disappear with time. Her reason for awakening him was to report on the progress of the sea grass.

Violent tides pulled up by the approaching moon, she began, had forced the grass to seek the more sheltered environment of the ocean bed. Here extreme pressure, darkness and a gradually rising temperature had brought about a significant mutation. In order to keep alive in those conditions the plants had to absorb large quantities of necessary minerals from the sea bed, and at the same time, because they had to retain their defensive mobility, their roots had to be shallow. The result was that they had to keep on the move.

Recently these mobile plants had begun to band together. There were now several hundred colonies of them crawling like vast, moving carpets across the ocean floor, grazing for minerals and the non-mobile strains of their own species.

"Leave them for a couple of million years," said Ross, sighing, "and see what happens." He turned to go below again. He agreed that it was a most significant mutation, the most promising yet, but his capacity for hope had gone.

Sister moved quickly in front of him. She said, "I would prefer you to remain awake, sir."

The wording and accompanying action made it seem more an order than a request. Ross felt anger stir within him, then die again. He said, "Why?"

"For psychological reasons, sir," the robot replied, respectfully enough. "You should remain awake for one month at least, so that you can appreciate and understand what has happened during the preceding period of suspended animation. Major changes are occurring and you are giving yourself no time to adjust to them. You must interest yourself in things again. We... we fear for your sanity, sir."

Ross was silent. In the present circumstances, he thought, sanity was a distinct disadvantage.

"We could hold another review, sir," Sister went on. "There are not as many robots available as there were last time, but then the visibility is not so good, either. We were thinking that we might stage a mock battle for you. The casualties would have to be pretended, of course, because we may not willfully damage or destroy ourselves unless in the defense of a human being, but we have absorbed many books on the subject of war and are confident that we could put on a show which would amuse you, sir." Ross shook his head.

"There are ways in which you could assist us..." began Sister, and then for the first time in countless thousands of years she began to tick! "How?" said Ross, interested at last. Outside a sudden rain squall left the ground steaming and the sky reasonably clear. Above the sea a vast, fuzzy crescent shone through the smoke haze. The sun was a formless white glare on the western horizon, so this must be the moon. Ross felt a tiny surge of hope at the sight, but it was the sad, negative sort of hope, the hope of escape.

He had missed Sister's opening remarks, and brought his mind back to present time to hear her saying, "... your instructions give us very little to occupy our time, and even a robot can become bored when forced simply to observe minute changes which require thousands of years to become manifest. For this reason we have, with the enormous store of data at our disposal, sought methods of reevaluating and extending our knowledge of the sciences. With the physical sciences we have made considerable progress..."

She began to tick again in the way which used to be indicative of a major dilemma. This was something about which she must feel very strongly.

"... But in the social and related sciences we have encountered problems on which we need human guidance," she finished with a rush. "Such as?" said Ross.

"An example," said Sister. "Is it allowable to force human beings into an advanced state of civilization rapidly, by means of periodic wars, supposing that there are very good, but not vital, reasons for wanting their advance to be rapid?"

You have been getting in deep water, Ross thought, surprised and more than a little awed. Aloud, he said, "Speaking from experience, I'd say that it is not allowable under any circumstances. Your hypothetical human beings should advance slowly and naturally, so that physical knowledge should not outstrip the psychological, if they are to survive to enjoy their advances..." He stopped, a growing suspicion beginning to form in his mind; then he added, "I know this is a hypothetical problem, but are the robots by any chance planning on fighting a war among themselves to increase their —"

"No, sir," said Sister.

But the suspicion would not leave him. He was remembering a discussion he had had with Sister a long time ago, about kindness, and lying, and puns. Certainly she had never made anything remotely resembling a pun, but she had done a few things which were meant to be kind. Maybe...

"Are you telling the truth?" he asked sharply.

"Yes, sir," said Sister again.

"If you are, that's what you would say," Ross said thoughtfully. "And if you are lying that is still what you would say." His voice became suddenly harsh. "But remember this. I want no wars, no matter how good the reasons appear for having them. That is an order!"

"I understand, sir."

"And to keep your busy little minds out of mischief," he went on, more quietly, "I have a job for you. It will require considerable time and effort, but when built will give me much more pleasure than any review or war games..."

In Xanadu did Kubla Khan...

Ross envisaged a palace to end all palaces, a slender shining tower a mile high possessing the internal capacity of a large city. The structural material would be transparent, allowing an unimpeded view in all directions while at the same time blocking off the heat and glare from the sun. Architecturally it would be simple and esthetically pleasing, as a whole and in its internal subdivisions, which should blend with and at the same time accentuate their contents. Furnishing his palace might be an even longer job than building it, because he wanted it to house reconstructions of all the famous sculptures, paintings, tapestries and other art treasures of the world. And at the earliest possible moment he wanted to be moved into the new structure. He was growing tired of always waking in his underground room, and when the new building was complete he wanted the old hospital closed up.

"Only the works which have been illustrated or adequately described in material found by the original search robots can be reproduced," Sister said when he had finished speaking, "paintings relatively easily and the three-dimensional works with more difficulty. Much original research in structural methods will be necessary, and as we lack the intuitive reasoning processes of human beings the project will take a long time."

"I've got plenty of that," said Ross easily. The He would have fooled a human, he thought, much less a robot.

He remained awake for three weeks on that occasion, watching from the control dome the colonies of pale green sea grass undulating along the ocean bed, and extending his requirements regarding the size and contents of the palace. Possibly he sounded a little on the megalomaniac side to Sister, but he hoped that she would not realize that all the amendments were designed solely to extend the time necessary to complete the project. For the truth was that he did not care at all about art treasures or a splendid crystal tower which soared a mile into the sky. All he wanted was that his frozen, sleeping body be transferred from its safe subterranean crypt to somewhere more... vulnerable.

When he returned to Deep Sleep it was with the memory of a gigantic crescent moon and the hope that Sister and the others would not miss him too much when he was gone.

Time passed.

Ninety-seven million miles away the sun grew old and small and hot. On Earth the icecaps finally disappeared, the seas never cooled and, with the rise in temperature, the molecular motion of gases saw to it that the planetary atmosphere leaked slowly into space. The moon continued to spiral in, pulling up tides which forced the sea grass even deeper into the ocean and caused many more significant mutations to occur, until it entered Roche's Limit and broke up. What the war had done to the planet was like a pinprick to what happened then.

Not all of the moon fell on Earth, only enough to raise the sea level by three hundred feet and open a few large cracks in the crust from which lava and superheated steam poured for many hundreds of years, and changed the planetary surface out of all recognition. Most of it remained in orbit, grinding itself into smaller and smaller pieces until Earth had a ring system to rival Saturn's.

Ross awoke to find the base of his tower one hundred feet below sea level, the local topography unrecognizable, and a night that was as bright as day. The rings blazed across the sky, dimming all but the brightest stars, a celestial triumphal arch. Every wave in the sea threw back a reflection which made it seem that his tower rose out of an ocean of rippling silver. And joining the blazing sky with the dazzling sea were the thin white tendrils of the shooting stars.

"How did the palace escape?" asked Ross bitterly.

He found himself lost after the first three words of the explanation, but the answer seemed to be some kind of force field, or repulsion field. "... And I regret to say, sir," Sister ended, "that the sea grass was unable to survive the catastrophe."

"Too bad," said Ross.

There was a long silence; then Sister suggested showing him around. It was mainly in order to please the robots who had built it rather than from curiosity that he agreed. He felt terrible.

Every synonym for magnificent, opulent and awe-inspiring could have been used to describe the palace in which he now lived. It was

vast, but comfortable; grandiose, but in perfect taste. Like a museum with fitted carpets, thought Ross ironically. But he was tremendously impressed, so much so that he did not mention to Sister the one minor, but maddeningly constant, error. In all the otherwise perfect reproductions of great paintings, regardless of how the original Old Masters had painted them, the faces and bodies had been given a deep, rich tan coloring with a background hint of green.

It was exactly the shade they had used in the blowup of Alice's picture, and he remembered telling Sister that it had been perfect. Which was probably the reason that they had given everyone the same complexion. After the first few days, however, he became accustomed to it.

Strangely, Sister made no objection when he asked to Deep Sleep.

The centuries passed like single cards in a riffled deck. He awoke to a sea which steamed all night and boiled all day. The air was a white, superheated fog from which there fell a constant, scalding rain. Altogether it was a monotonous, depressing sight and after the first day Ross stopped looking at it. Instead he wandered the vast halls and corridors, over floors so smooth and mirror-polished that there were times when he felt he would fall through them onto the ceiling, or across carpets so thick in the pile that it was like walking in long grass, like a silent and resplendent ghost. He rarely spoke, and when he did it was more often to the Tailor than to Sister. His thoughts and mood were reflected in his dress.

There was the black uniform, severely cut and edged with the bare minimum of silver braid, and the long, ankle-length cloak with the single silver clasp at the throat which went with it; that was the uniform of brooding tragedy. Then there was the white uniform that was heaped with gold braid, decorations and a Noble Order represented by the scarlet ribbon which made a broad, diagonal slash across the chest. A cloak of ermine and purple went with that one, and a crown. That was the dress of a man who, literally, owned the world. And then there were the shapeless white jacket and trousers which had been the uniform of a working Doctor…

Sister did not like his wearing that uniform, neither did she

approve of his requests that some of the robots be given human shape, using plastic foam on a humanoid form. Such activities were psychologically undesirable, she said. And it was Sister who, on the eighteenth day since his latest awakening, suggested that he go into Deep Sleep again.

He wondered about that and, because no subjective time at all elapsed during suspended animation, he was still wondering about it when he was revived.

The sun had become an aged, malignant dwarf whose glare had left Earth a desiccated corpse. The seas had long since boiled away into space and with them had gone the air. The atmosphere which remained was too rarefied to check the meteorites which still fell from the rings. The sky was black; all else — the sun, the rings, the cracked, dusty earth — was a searing, blinding white. A high-pitched humming sound pervaded every room and corridor in the palace, and he was informed that it was produced by mechanisms laboring to keep the internal temperature at a level comfortable to its human occupant, and that the noise was unavoidable. An even more disquieting occurrence was that Sister no longer accompanied him wherever he went.

The reason given was that she had other duties to perform.

Three days later, while wandering about on the lower levels, he found her stopped outside the door to one of the sub power rooms. She was not simply in a state of low alert; she seemed completely lifeless. Nothing that Ross could do, from shouting to beating on her shiny casing with hands and feet, elicited a response. For the first time the realization came that she — it — was only an involved piece of machinery rather than a near-human servant and friend. It made him feel suddenly afraid, and lonelier than ever. He thought regretfully, I have been wasting Time…

The two years spent in the blackened, smoking world, when he had worked, studied and initiated the first robot search for surviving life, had been happy and at the same time something of which he could feel proud. Even happier had been his second awakening, to the fresh, green world he had brought into being, with that world-girdling vacation with Sister and the A17. But within a few days he had given in to despair and talked Sister into putting him to sleep again. Since then his life had been a series of disjointed episodes in a violently changing world. To him only a few days had passed since the two robot aircraft had crashed — he was still sorry about that — and the seas had started to boil. Why, his body still retained the tan from the vacation!

Recently — recently? — Sister had deliberately avoided giving him the exact figures, but he knew that countless millions of years had passed while he aged a few weeks. At the present rate the very universe could live and die, and he would still be in his early twenties,

still living and still wanting to sleep farther into the future, while around him stretched eternal blackness and the cold, lifeless cinders of the stars.

He should have faced up to reality millions of years ago, when his sea grass was crawling about the ocean bed and exhibiting the first stirrings of intelligence, and he should have lived out his life then. Probably he would not have accomplished anything, but at least he would have tried. Just as Pellew, Courtland and the others had tried. He thought again of those great old men who had taken it in turns to stand solitary watch over the hospital's dwindling Deep Sleepers. They had faced loneliness and despair also, and at times they must have reached the brink of madness, but they had not stopped trying until they had stopped living. He had thrown their lives away along with his own.

The vast robot potential he had wasted by assigning impossible tasks, simply from a cowardly- desire to die in his sleep. He should have considered the interplanetary angle more fully, tried to transplant Martian or Venusian life forms into a sterile Earth. The result might have been nightmarish, but it would have been life. He was sure that Pellew would have understood and forgiven him if it hadn't been human life. There were a lot of things he could have, and should have, tried.

Ross bent forward and slowly put Ms hand on her smooth metal casing and looked at the glinting, emotionless lenses, neither of which moved. Sister had always looked emotionless, and he shouldn't get so worked up over an outsize metal egg which had finally broken down.

"I'm sorry," he said, and turned to look for another robot who would be able to put him into Deep Sleep again. There seemed to be very few robots about, these days…

He awoke with the conviction that he was dreaming that he was awakening, because Sister was bending over him. "But you're dead," he burst out.

"No, sir," Sister replied, "I was reparable."

"I'm very glad to hear it," said Ross warmly. "And Sister, this time I'm going to stay awake no matter what. I ... I would like to die of old age, among friends —"

"I'm sorry, sir," the robot broke in. "You have been revived only that we may move you to safer quarters. The refrigeration units over most of the tower have failed, and only a few sections are inhabitable over long periods. You will be much safer in Deep Sleep."

"But I don't want —"

"Are you able to walk, sir?"

There followed a hundred-yard walk which developed quickly into a hobbling run as the plastic flooring burned his feet and a blast-furnace wind scorched his skin and sent the tears boiling down his cheeks. He caught glimpses of charred furniture and cracked or melted statuary, but he didn't see outside. Which was probably a good thing. The run ended in a narrow, circular tunnel which terminated in a tiny compartment containing little more than a Deep Sleep casket. The heavy, airtight door swung shut behind them.

"Turn around slowly, sir," said Sister, aiming a gadget at him which emitted a fine odorless spray. "This should help you later…"

"It's staining my skin green…" began Ross, then snapped, "But I want to stay awake!"

Sister went through the motions of assisting him into

the Deep Sleep casket. In actual fact she forced him into it and held him while a sedative shot she had administered took effect. "Wait! Please!" he begged. He thought he knew what was happening and he felt horribly afraid.

Selfishly, the robots were going to keep him alive as long as they could. When outside conditions made it impossible to keep this tiny compartment refrigerated, they would refrigerate only the casket. He would go on living in Deep Sleep until the last robot died. Then the cooling unit would fail and he would awake for the last time, briefly, in a casket which was fast becoming red-hot…

But there was something wrong about the whole situation.

"Why did you wake me?" he asked thickly. "Why didn't you move me without waking me up? And you gave me a shot. There haven't been any medical supplies since..."

"I wanted to say good-bye, sir," said the robot, "and good luck."

When the human Ross was safely in Deep Sleep, Sister spoke again. It used a language which was flexible, concise, yet highly compressed — the language which had been developed by intelligent, self-willed robots over two hundred million years and which traveled, not through air or ether, but by a medium which brought it to the other side of the galaxy at the speed of thought.

"Sister 5B" it said. "Mr. Ross is in Deep Sleep. Latest observations corroborate our predictions that the sun will shortly enter a period of instability. The detonation will be of subnova proportions and will precede its entry into the cooler red-dwarf stage, but in the process all space out to the orbit of Saturn will become uninhabitable for human or robot life. Is Fomalhaut IV ready?"

"Anthropologist 885/AS/931," replied another voice. "It is ready, 5B. But you realize that the closer the natives approach our Master's requirements the more difficult it has been to control them. I keep wanting to call them 'sir.' And his definite wish that war not be used to accelerate the rise of civilization here has delayed matters, although it has produced a culture which is infinitely more stable than that possessed by Earth —"

"Geneticist 44/RLB/778," broke in another voice. "I do not agree with this philosophical hairsplitting! At a time when Earth still retained her oceans we found a planet at the stage where saurian life was being replaced by mammalian, and we controlled and guided the evolution of these mammals until we have reached the point where they duplicate the original human life form so closely that interbreeding is possible. When does a perfect duplicate become the real thing?"

"Sister 5B," returned the original speaker. "It was hairsplitting such as this which allowed us to evolve intelligence, plus the general instructions issued to us by the Master. First we convinced ourselves that a motionless, unthinking and unliving human being in Deep Sleep was alive, when all logic contradicted this. Then we took his instructions to find, aid and protect all forms of life, in conjunction with his wishes expressed during cold delirium regarding the female human Alice, and twisted them to our own selfish purposes…"

They had been told to search and when Earth and the nearer planets proved empty of human survivors they had continued outward

to the planets which circled other suns, all the time concealing that fact. Ross had once discussed lying and kindness with Sister, and the robots had tried very hard to understand and practice those concepts. They had had an unfortunate tendency to tick when a direct lie was called for, but otherwise they had managed very well. When a subspace drive was developed with the aid of pre-war Earth mathematics, they had concealed that also, just as they kept quiet when their metal bodies became obsolete and they evolved into beings of pure force. A few of them had to energize the old-style bodies for Ross's benefit, and once Ross had found Sister's body while it was vacant…

"… But now we are about to carry out his wishes and keep ourselves alive into the indefinite future as well. When he comes to the planet and race we have prepared for him, his life will end a little more than a half century hence. But we will not die because his descendants will be partly human, and we are very good at splitting heirs."

"Geneticist 44/RL/778. With all respect, the Master should not have told you about puns, 5B."

"So we will continue to search," Sister 5B went on, "safe in the knowledge that our Master is immortal. We will gather data, we will aid or guide life forms which we encounter, or ignore them if this appears to be the kinder thing to do, and we will expand throughout all the galaxies until the end of space is reached…"

"Astronomer 226/V/73," broke in a new voice. It was polite, as befitted one who was addressing the being who had spent practically all its life close to the Master, yet at the same time it was tinged with impatience at these older robots who insisted on repeating things everyone knew already. It said: "If it transpires that the space-time continuum has positive rather than negative curvature and we return to this galaxy, our starting point, what then, 5B?"

"We will say," 5B replied quietly, "'Mission accomplished, sir. Have you any further instructions?'"

Ross awoke and, as he had done three years and an eternity ago,

began to exercise painfully by crawling about on the floor. The air smelled fresh and cool and there was no sign of Sister or anyone else. He ate, exercised and ate again. Almost by accident he discovered the sliding door which opened into a compartment which contained a large circular picture of the branch of a tree. There was a startling illusion of depth to the picture, and when he moved closer to examine the odd, feathery leaves he discovered that it wasn't a picture at all.

He left the tiny ship and stumbled through a carpet of grass patterned by weeds and bushes which had never grown on Earth. He breathed deeply, through his nose so as to hold the scent of growing things for as long as possible, and his pulse hammered so loudly in his ears that he thought that he might prove once and for all whether it was possible to die from sheer joy. It was only slowly that sounds began to register: leaves rustling, insect noises, the swish of passing cars and the thump of waves on a beach. Five minutes took him to the edge of the sea.

There was nothing strange about the sand or the sky or the waves, except that he had never expected to see such things again. But the group of people lying on the beach was alien. It was a subtle alienness which, Ross now realized, he had been prepared for by the reproductions in his palace — an underlying greenish tinge to their otherwise normal skin coloring. And even at this distance he could see that the people sprawling on their brightly colored bath towels might all have been close relatives of Alice…

The implications were too vast for him to grasp all at once. He swallowed a couple of times, then said simply, "Thank you, Sister."

A silent, invisible globe of force which hovered protectively above his head bobbed once in acknowledgment. Sister had evaluated the situation and had long ago decided that allowing the Master to think that all the robots had died would be the kindest thing to do.

Ross walked slowly toward the bathers, knowing somehow that he had nothing to fear. There might be language difficulties at first, misunderstandings, even unpleasantness, but they did not look like the sort of people who would hurt anyone simply for being a stranger. They didn't seem… warlike.

They were different, of course, but not much. You wouldn't mind if your sister married one of them.

Come to think of it, he thought, you wouldn't mind marrying one yourself.

End of the ebook.

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